

**National Park Service
U.S. Department of the Interior**



**Amistad National Recreation Area
Texas**

Fire Management Plan Environmental Assessment

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Environmental Assessment/ Assessment of Effect

Fire Management Plan Amistad National Recreation Area, Texas

SUMMARY

Amistad National Recreation Area is planning to prepare a Fire Management Plan (FMP) to guide future fire and fuel management at the park. Goals for this plan include protecting life and property, maintaining the park's utility as a recreation area, protecting sensitive cultural and biological resources, and supporting an integrated non- native plant control program. Two alternatives are considered in this document. Alternative A, the No Action Alternative, calls solely for continuing the current practice of combating all wildland fires using Appropriate Management Response (AMR). Alternative B, which was identified as the alternative preferred by the National Park Service, also calls for using AMR to fight all wildland fires. However, Alternative B calls for additional measures as well, including clearing flammable vegetation near structures, protecting sensitive cultural and biological resources, removing shrubs around boat access areas, and supporting a program to control some non- native plants by using prescribed fire. An analysis of the environmental consequences of each alternative on the park's resources and values indicated that there would be no major impacts under either alternative. However, Alternative B provides more long- term benefits and is the only alternative that accomplishes all four FMP goals.

PUBLIC COMMENT

If you wish to comment on the Environmental Assessment, you may mail or email comments to the name and address below. This Environmental Assessment will be on public review for 30 days. Please note that names and addresses of people who comment become part of the public record. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** We will make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

Alan Cox, Superintendent
Amistad National Recreation Area
HCR 3, Box 5J
Highway 90 West
Del Rio, TX 78840- 9350

Email: Amis_Planning@nps.gov

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Glossary

The description and discussion of strategies under consideration in this document includes several fire- related terms that may not be widely known among the general public. These terms include:

Appropriate Management Response (AMR) – a flexible approach used for fighting wildland fires that calls for a control suppression strategy (stopping a fire from spreading) when feasible, but allows for a confinement strategy (allowing a fire to spread within a defined area) when the safety of firefighters could be at risk or it is determined to be most efficient when considering the totality of the situation.

fire break – a natural or manmade barrier to fire, such as a river, road, or excavated line, that is devoid of flammable vegetation.

fuel management – the use of methods such as prescribed fire and manual and mechanical means to reduce flammable vegetation that accumulates over time.

manual fuel reduction methods – the use of manual tools, including hand tools and chainsaws, to reduce fuels or create fire breaks.

mechanical fuel reduction methods – the use of heavy machinery, such as bulldozers or roadgraders, to reduce fuels or create fire breaks.

prescribed fire – any fire intentionally ignited by fire professionals to achieve specific objectives.

wildland fire – any non- structure fire, other than prescribed fire, that occurs in the wildland.

wildland fire use – the management of a naturally ignited wildland fire to achieve resource management objectives.

CHAPTER 1: INTRODUCTION

Amistad National Recreation Area (Amistad NRA), located in Val Verde County, Texas along the United States- Mexico border, consists of a reservoir resulting from the construction of a 6.1- mile long dam on the Rio Grande and the immediately adjacent lands on the U.S. side. The primary purposes of the dam were to provide flood control and generate hydroelectric power, although providing water for irrigated agriculture became one of the most important dam functions following construction. The dam was completed in 1969 through the joint efforts of the U.S. and Mexican Governments, and is operated by the International Boundary and Water Commission. The National Park Service (NPS) began managing the U.S. portion of the reservoir and the immediately surrounding area in 1965. On November 28, 1990, these lands were officially designated as the Amistad National Recreation Area in order to “provide for public outdoor recreation use and enjoyment of the lands and waters associated with the United States portion of the reservoir known as Lake Amistad” and to “protect the scenic, scientific, cultural, and other value(s) contributing to the public enjoyment of such lands and waters” (Public Law 101- 628).

Amistad NRA is located just northwest of Del Rio and about 150 miles west of San Antonio (Figure 1). The park includes the United States portion of the Amistad Reservoir, which extends 83 miles up the Rio Grande, 25 miles up the Devils River, and 14 miles up the Pecos River (Figure 2). Amistad NRA covers 58,500 acres, most of which are typically underwater. The amount of land area in the park fluctuates dramatically as the water level of the reservoir fluctuates. When the reservoir is at conservation level (1,117 feet above sea level), approximately 18,500 acres are exposed and 40,000 acres are inundated. With exceptions in a few areas, the park boundary extends up to the 1,144.3-foot contour line, which is the highest level the reservoir can theoretically reach. The park also contains five hunt areas, which cover 2,460 acres when the reservoir is at conservation level (Figure 3). Most of the 540 miles of shoreline at Amistad NRA consist of limestone cliffs and banks.

Purpose and Need for Action

This Environmental Assessment (EA) evaluates strategies for the management of fire and fuels within the park for the protection of the park’s resources and values. The strategy that best protects these resources and values will be incorporated into a Fire Management Plan (FMP) for the park. Therefore, the proposed action is the development of a FMP for Amistad NRA.

Federal Wildland Fire Policy mandates that every federal area with burnable vegetation must have a Fire Management Plan (USDA/USDI 1995). This policy is further detailed in Director’s Order 18, which states, “Each park with vegetation capable of burning will prepare a fire management plan to guide a fire management program that is responsive to the park’s natural and cultural resource objectives and to safety considerations for park visitors, employees, and developed facilities” (NPS 2002). In addition to this regulatory



Figure 1. Location of Amistad National Recreation Area.

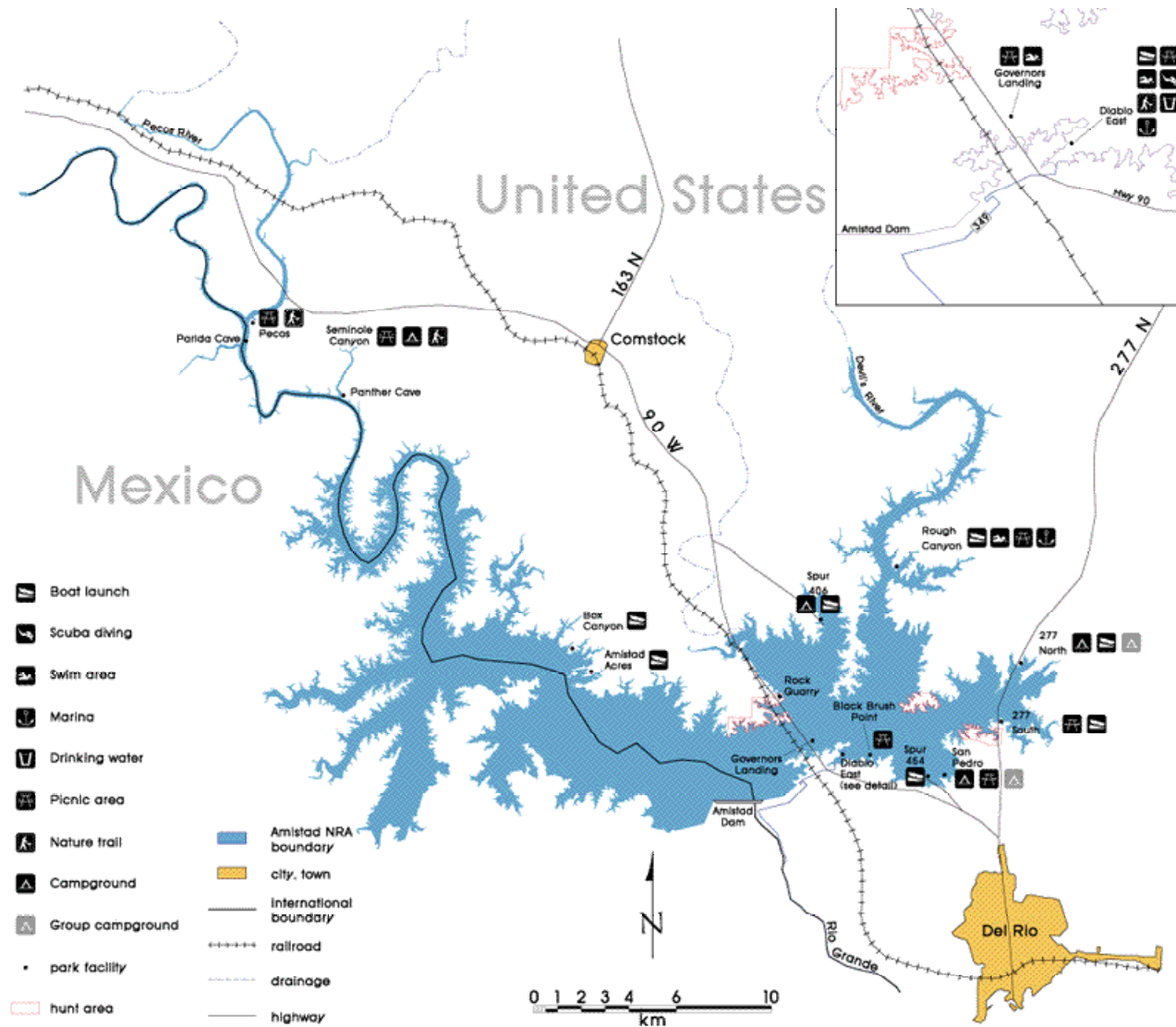


Figure 2. Map of Amistad National Recreation Area.

Hunt Areas

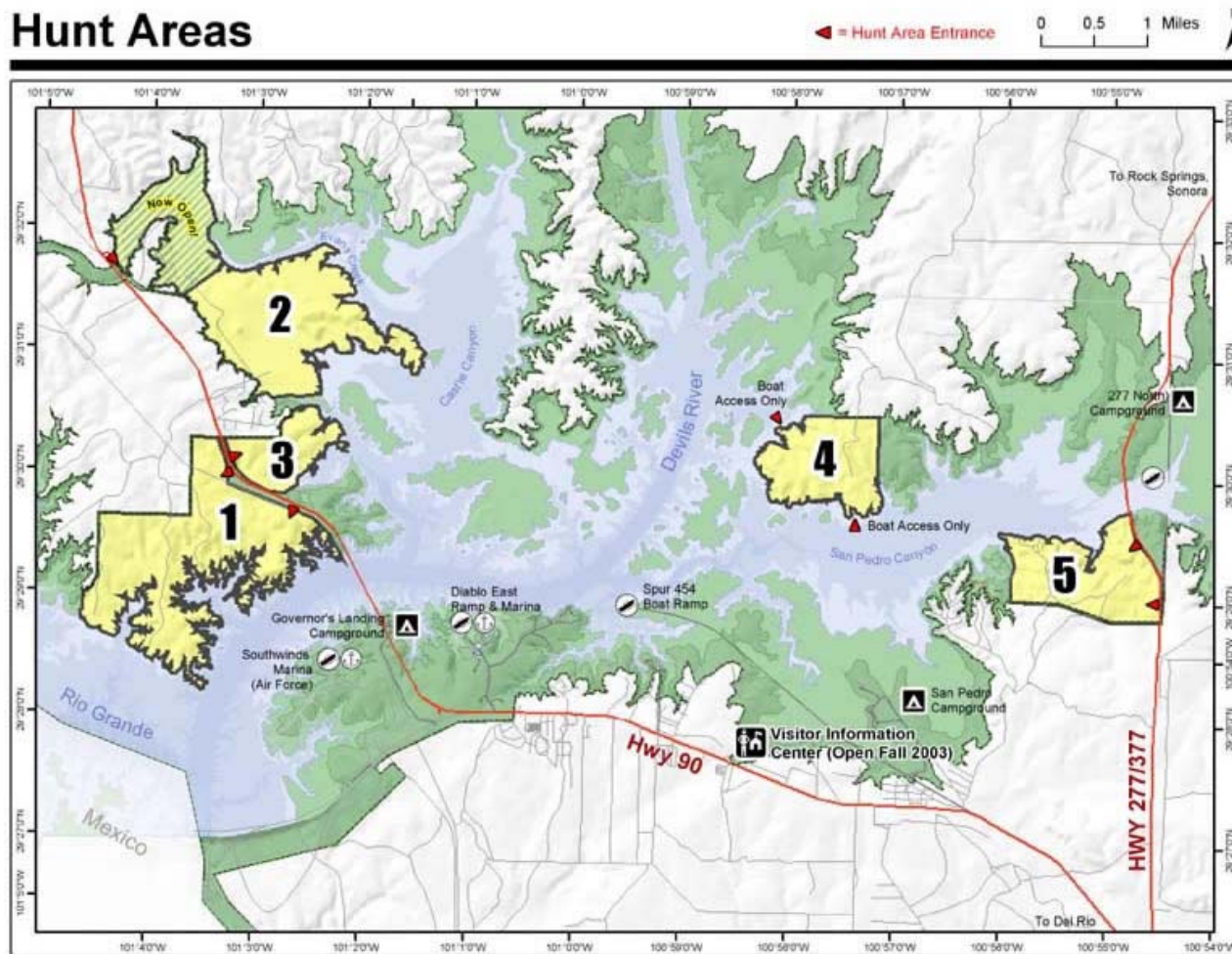


Figure 3. Hunt Areas at Amistad National Recreation Area.

requirement, the following overview of the current conditions at Amistad NRA illustrates the need for a Fire Management Plan.

Given the rapidly changing environment at Amistad NRA due to reservoir level fluctuations, the park's important archeological features, and vegetation buildup around park structures over time, there are several potential threats to public safety and park resources related to fire management.

Over time, fuels have built up around structures within the park. Fuels have also built up around important archeological sites, including those containing features susceptible to severe fire damage, such as pictographs. There is a risk that structures inside the park, as well as irreplaceable archeological resources, could be destroyed or damaged by a wildland fire in the future due in part to this fuel buildup.

Shrubs and small trees have invaded some low-lying areas that have become exposed in recent years as the reservoir level has dropped. After 11 years of low water levels due to drought, abundant recent rainfall is causing the reservoir to rise dramatically. As areas that have been exposed for a decade become inundated again by rising reservoir levels, the shrubs and small trees growing on them may become hazardous snags that could potentially damage watercraft, though they may also provide excellent fish habitat. In 2003, over 1,150,000 people visited Amistad NRA, most of whom used boats for fishing and other recreational activities.

Two non-native species, tamarisk and giant reed, have formed dense thickets along much of the Rio Grande and other areas around the reservoir. Tamarisk has been shown to outcompete and crowd out native vegetation, increase soil salinity, provide less value to most wildlife species than native riparian vegetation, and may lower water tables (Carpenter 1999). Giant reed tends to form dense, monotypic stands that crowd out all native vegetation and is less valuable to wildlife than native vegetation as both food and habitat (Bell 1986).

Relationship of the Proposed Project to Previous Planning Efforts

Although fire has not been specifically involved in any previous planning efforts, the preferred alternative of the FMP will be consistent with the general objectives outlined in the park's new General Management Plan and Resource Management Plan.

Regulations and Policies

Many regulations and policies must be taken into consideration when planning fire management. Some specific fire management policies are set forth in section 4.5 of 2001 Management Policies (NPS 2001) and are summarized below:

- Fire management programs will meet resource management objectives while ensuring protection of life and property.
- Parks with vegetation capable of burning will prepare Fire Management Plans (FMPs) and address funding and staffing required by fire programs.

- Fire plan development will include the National Environmental Policy Act (NEPA) compliance process and necessary collaborations with outside parties.
- Fires in vegetation are to be classified as wildland or prescribed fires.
- Wildland fires are managed according to considerations of resource values, safety, and cost.
- Prescribed fires are ignited to achieve resource management goals and closely monitored to determine whether they successfully meet objectives.
- Parks lacking approved plans must suppress all wildland fires using Appropriate Management Response that includes methods that are the most cost effective while causing the least impact.

Many other plans and policies direct the formulation of the FMP and the environmental analysis that supports it:

- Archaeological Resources Protection Act (1979) – provides for the protection of archeological resources on public lands.
- American Indian Religious Freedom Act (1978) – protects access to sites, use and possession of sacred objects, and freedom to worship through ceremonials and traditional sites.
- Clean Air Act (as amended 1990) – includes national ambient air quality criteria; states that federal land managers have an affirmative responsibility to protect air quality related values from adverse impacts.
- A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10- Year Comprehensive Strategy Implementation Plan (National Interagency Fire Center 2002) – a strategy for reducing wildfire risks and improving collaboration with affected agencies and parties.
- Director’s Order 12: Conservation Planning, Environmental Impact Analysis, and Decision Making (2001) – interprets the National Environmental Policy Act for the National Park Service.
- Director’s Order 18: Wildland Fire Management: (2002) – expresses NPS fire policy.
- Endangered Species Act (1973) – provides for listing and protection of endangered and threatened species and their critical habitat; requires consultation under Section 7 if any listed species may be adversely affected.
- Executive Order 11988: Floodplain Management (1977) – provides for the protection of floodplains.
- Executive Order 11990: Wetlands Protection (1977) – provides for the protection of wetlands.
- Federal Water Pollution Control Act (1972; amended as “Clean Water Act” in 1977) – limits discharges into US waters to maintain water quality.
- Federal Wildland Fire Management Policy (1995) Review and Update (National Interagency Fire Center 2001) – provides a common approach to wildland fire management for U.S. Department of Interior agencies and the USFS.
- Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems—A Cohesive Strategy (USDOJ/USDA 2002) – provides an approach for protecting communities in rural areas from wildfires.

- Native American Graves Protection and Repatriation Act (1990) – provides a process for museums and federal agencies to return certain Native American cultural items to their descendants and affiliated tribes.
- National Environmental Policy Act (1969) - requires federal agencies to consider environmental values and integrate them into their proposed actions (abbreviated as NEPA).
- National Fire Plan (2001) – manages the impact of wildfires on communities and the environment.
- National Historic Preservation Act (1966) – guides preservation of historic properties.
- National Park Service Organic Act (1916) - defines NPS management responsibilities as conserving scenery, natural and historic objects, and wildlife to provide for the enjoyment of future generations.
- National Parks and Recreation Act (1978) – requires park management to provide measures for the preservation of the area’s resources, consider how development affects public enjoyment, identify visitor carrying capacity, and propose any changes to boundaries.
- Reference Manual 77 (NPS 1999 and in progress) – offers comprehensive guidance to National Park Service employees responsible for managing, preserving, and protecting the natural resources found in National Park System units.
- Wildland Fire Management Reference Manual 18 (1999) – contains NPS wildland fire management requirements and procedures.

Goals and Objectives

The National Park Service’s Reference Manual 18 (NPS 1999) directs National Park Service units to utilize wildland fires and prescribed fires to accomplish safety and resource management objectives.

At Amistad NRA, a National Park Service/ University of Arizona (NPS/ UA) team (see Consultation/ Coordination section following Chapter 3) developed the following list of goals and objectives that would address the threats described above and be fulfilled under a successful fire management program:

Protect life and property.

- Protect structures inside the park from wildland fire and other structures near the park from escaped fires.
- Provide for firefighter and public safety to the greatest extent possible.

Maintain boat access points and beaches.

- Ensure that boats can be safely used at access points and beaches can remain open as reservoir levels fluctuate.

Protect sensitive cultural and biological resources.

- Ensure that fires and fire management activities do not have a negative impact on sensitive cultural and biological resources.

Support an integrated non- native plant control program.

- Where applicable, use fire as part of an integrated non- native plant control program to control non- native plants such as giant reed and tamarisk.

The National Park Service proposes to utilize the strategies that best accomplish the above goals and objectives at Amistad NRA.

Issues and Impact Topics

This document assesses the environmental effects of FMP alternatives – different ways of satisfying the purpose and need of the proposed action. Issues are problems, questions, concerns, or even benefits that could be caused by one or more of the alternatives. The NPS/UA team identified issues based upon park staff experience and knowledge of the park, as well as by using the NPS Intermountain Region Environmental Screening Form, and then grouped these issues into impact topics. Those impact topics that include issues where there is likely to be a greater than negligible impact despite mitigation are presented below. Relevant park resources as well as potential impacts to these resources are analyzed in detail in Chapter 3: Affected Environment and Environmental Consequences.

Several other impact topics were considered, following DO- 12 guidelines, but were determined not to cover any issues where there is likely to be a greater than negligible impact following mitigation. These impact topics are discussed in the “Impact Topics Dismissed from Further Consideration” section below.

Description of Issues and Impact Topics

IMPACT TOPIC #1: PUBLIC AND STAFF SAFETY

- Fuel accumulation puts structures inside the park at risk.
- Smoke from fires in the park could pose a health hazard to visitors and local residents.
- Fires can be dangerous for park personnel engaged in fire management activities, especially in areas with heavy fuel buildup and inadequate escape routes.
- Illegal immigrants concealed in dense vegetation could be injured or killed by prescribed or wildland fires.
- Wildland fires, particularly those burning in narrow river corridors, could escape and threaten private structures/residences.
- Fuel reduction measures could help reduce safety risk.

IMPACT TOPIC #2: VISITOR EXPERIENCE

- Due to low water levels in the reservoir, shrubs have become established throughout the park in low elevation areas. These shrubs may pose a safety hazard to boats when water levels become high and may make some lake access points unusable.
- Prescribed fire and other fuel reduction methods could be used to reduce shrubs around lake access points, ensuring that boat ramps and swimming beaches can remain open as water levels fluctuate.
- Fires could temporarily restrict public access to some areas.
- Fires could increase visitor access to some areas by reducing brush.

IMPACT TOPIC #3: CULTURAL RESOURCES

- Fires could damage or destroy archeological resources, including rock art, artifacts, and organic materials.
- People engaged in fire management activities may remove archeological resources from the park or inadvertently destroy them.
- Fires may reveal new archeological resources, which can potentially increase our knowledge of the park's history, but also makes those resources less protected.
- Coordination with the park's Cultural Resources Program Manager during all fire management activities can ensure that cultural resources are protected to the greatest extent possible.

IMPACT TOPIC #4: VEGETATION

- Fire could promote the growth of non- native species, including tamarisk, giant reed, and buffelgrass.
- Prescribed fire could help control tamarisk and giant reed if used as part of an integrated non- native plant control program.
- Native trees may be killed during fires and replaced by non- native plants.
- Native vegetation generally may be slow to recover following fires due to the presence of trespass non- native grazing animals, such as sheep and goats.
- Fire may result in increased grass cover and reduced shrub cover.

IMPACT TOPIC #5: WILDLIFE

- Some animals, including state- protected species, could be injured or killed during wildfires.
- Renewed plant growth following fire may be beneficial for grazing and browsing animals.

Impact Topics Dismissed from Further Consideration

Council on Environmental Quality guidelines state, “(m)ost important, NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail.” (CEQ 1978). Therefore, the following impact topics and issues specified in DO- 12 or identified by park staff were dismissed from further consideration:

AIR QUALITY

Amistad NRA is not a Class I area under the Clean Air Act, and therefore is under less stringent air quality requirements than many other National Parks. The Texas Commission on Environmental Quality (TCEQ) is the regulatory agency in charge of monitoring and protecting air quality at Amistad NRA and throughout the state. Emissions from wildland and prescribed fires are not regulated under federal or Texas state law unless there will be a permanent or long-term effect on air quality (Sandberg et al. 2002). However, the park will contact the TCEQ in Laredo prior to conducting any prescribed fires, provide the agency with a written burn plan, and allow a TCEQ representative to visit the area to be burned before and during the prescribed fire.

There are several other state regulations regarding prescribed fires (30 TAC Chapter 111, Rules 111.211 and 111.219). For example, the park must:

- notify the local fire and police departments;
- burn downwind or at least 300 feet from any residences unless written permission is obtained;
- only burn when the wind will not cause smoke to have adverse effects on roads, navigable waterways, or occupied buildings;
- post people on the highway if the road does become obscured by smoke;
- begin the burn at least one hour after sunrise and complete it at least one hour before sunset;
- attend the fire at all times;
- only burn when wind speed is predicted to be between 6 and 23 miles per hour during the burn period;
- not burn hazardous materials;
- not burn during an actual or predicted low – level atmospheric temperature inversion, and
- not burn if an ozone advisory or ozone action day has been declared.

Amistad NRA will comply with these rules, which are designed to ensure that any prescribed fires will have a minimal effect on air quality. All wildland fires will be suppressed using a control, contain, or confine strategy, and therefore wildland fires will have the smallest impact on air quality that can be achieved. Because there will be no wildland fire use under the plan, and the park will comply with all state air quality regulations regarding prescribed fires, we do not predict that any air quality issues will arise, and do not consider air quality further in this document.

ENVIRONMENTAL JUSTICE

Although Amistad NRA is located near the city of Del Rio, which has minority and low- income neighborhoods, we do not anticipate that residents will be adversely affected by fire and fuel management activities. AMR will be used to control any fire near the urban interface. Given the low level of fuel connectivity near the urban interface, it is unlikely that a fire from within the park could potentially threaten structures in minority or low- income neighborhoods outside the park boundary.

Any reduction in air quality due to smoke from fires will not disproportionately affect minority or low- income neighborhoods. No prescribed fires are planned along the urban interface.

FLOODPLAINS AND WETLANDS

Because the park boundary follows the contour line marking the highest elevation that Amistad Reservoir can normally reach and the reservoir level fluctuates, most of the park could theoretically be considered a floodplain, with the exception of the higher elevation portions of the hunt areas and some of the developed sites south of the reservoir.

Due to the frequent, rapid, and large changes in water level within the reservoir, most of the plant species in the floodplain areas that could potentially be burned thrive in disturbed areas. The impact of fire on these areas will be negligible compared to the impact of the water level

fluctuations. There will be no construction of any sort associated with this project, nor are fire management activities likely to have an adverse effect on water quality or aquatic ecosystems.

Ironically, even though much of the park is underwater, Amistad NRA contains few wetlands. The only wetlands in the park are a few springs along the Devils River, the Pecos River, and Cow Creek. Both alternatives considered call for combating fires using AMR in the riparian areas where springs occur. Therefore, all wetlands will be protected from any negative effects of fire to the greatest extent possible.

Overall, we do not anticipate that any fire management activities could potentially have an adverse impact on wetlands or floodplains. Any incidental impact these activities could have will be negligible compared to the impact of reservoir water level fluctuations.

SOCIOECONOMICS

Amistad NRA, with over 1,150,000 visitors per year, is an important part of the local economy. To date, no area of the park has ever been closed due to fire management activities. Under the preferred alternative, some small areas may have to be closed temporarily. However, because any such closures would be brief and only affect a small area, and the vast majority of visitors come to Amistad NRA in order to enjoy the lake, we do not anticipate that fire management activities would have a negative effect on the area's economy. Furthermore, any temporary losses may be offset by the presence of additional firefighting personnel, who will need to be housed and fed. Proactive fire management activities can be scheduled so that they do not interfere with fishing tournaments, which is the most important park-related socioeconomic factor for the area.

LAND- USE CONFLICTS

The alternatives considered do not present any land-use conflicts. The impact of the alternatives on recreational use is considered under the "Visitor Experience" impact topic.

WATER QUALITY

Given the topography of the park and the limited scope of the prescribed fires considered in the plan, water quality is unlikely to be measurably affected by fire management activities.

BORDER ISSUES

Due to its location on the US-Mexico border, some specific border-related issues arise when planning any management action. In the spirit of friendship for which the park is named, Amistad NRA staff will invite the firefighting agency in the nearby city of Ciudad Acuña, Mexico to become involved in both the planning and implementation of the park's fire management program.

To expedite cross-border support during wildland fires, an agreement was made in 1999 between the U.S. Department of the Interior, U.S. Department of Agriculture, and the Mexican Secretariat of Environment and Natural Resources (USDI 1999). This agreement allows for cross-border wildland fire suppression in cases where a fire burning in one country may threaten the resources of the other. The zone in which assistance can be provided extends for 10 miles on each side of the international border. The Santa Ana/Lower Rio Grande National Wildlife Refuge in Alamo, Texas is responsible for coordinating local operational plans. These plans outline how requests for assistance are handled; operational details such as how

firefighting units will cross the border, communicate, travel, keep records, and be reimbursed; and who is authorized to make decisions.

Many illegal immigrants cross into the United States through Amistad NRA every year, some of whom transport illegal drugs (Bruce Malloy, pers. comm.). Although people transporting drugs can be dangerous to law enforcement personnel, it is unlikely that they pose any threat to firefighters, because their main goal is to avoid being noticed. However, people crossing the border may take temporary refuge in the dense vegetation along the rivers. In order to ensure that no one is injured during prescribed fires, park staff will issue press releases on both sides of the border before prescribed burns take place. Staff will also make verbal announcements, in English and Spanish, around the burn area prior to ignition to warn any concealed people. This aspect is addressed under the “Public and Staff Safety” impact topic.

GEOHAZARDS

Generally, areas of the park below 1,117 feet have little soil due to erosion from water fluctuations and wave action. However, large amounts of lake sediment have been deposited and exposed in side canyons and other sheltered areas as the lake has receded from its peak level. Due to the topography of the park (primarily limestone cliffs), and the huge impact of reservoir level fluctuations over the last 35 years, fire is unlikely to accelerate erosion on slopes or otherwise modify drainage or soil structure.

ENERGY REQUIREMENTS/ CONSERVATION POTENTIAL

The alternatives considered do not affect energy requirements or conservation potential.

NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS/ CONSERVATION POTENTIAL

The alternatives considered will not impact natural or depletable resources, except as already covered in the impact topics under consideration.

PRIME OR UNIQUE AGRICULTURAL LANDS

There are no prime or unique agricultural lands within the affected area, according to the USDA Natural Resources Conservation Service.

INDIAN TRUST RESOURCES

No Indian Trust resources have been designated within the affected area, according to the Cultural Resources Program Manager.

ECOLOGICALLY CRITICAL RESOURCES

The only portions of the park that could potentially be considered ecologically critical are the uppermost few miles of the Devils River (above Indian Springs) and the uppermost few miles of the Pecos River (above Dead Man’s Canyon), because these areas have been less adversely affected by the reservoir than other parts of the park. However, no prescribed fires or fuel reduction measures are planned in either area. Furthermore, wildland fire is very uncommon in these riparian areas. Therefore, these areas are unlikely to be impacted under either of the alternatives described in this document.

CHAPTER 2: ALTERNATIVES

The NPS/ UA team identified three alternatives for managing fire at Amistad NRA. The first option is the “No Action Alternative,” which calls for continuing the currently employed fire management strategies. The second alternative, the AMR/ Prescribed Fire Program, was identified as a way to accomplish the fire management goals and objectives listed above. A third alternative that included wildland fire use was considered but rejected.

Alternative A: No Action Alternative

National Park Service areas without fire management plans must suppress all wildland fires and cannot conduct prescribed burns (NPS 2002). Under the No Action Alternative, these policies will continue at Amistad NRA.

Park wildland fires are currently managed using Appropriate Management Response (AMR). Under AMR, confinement, rather than an immediate control suppression strategy, is permitted if the risk to firefighters or cost is great. At Amistad NRA, confinement is typically used when fires occur in remote areas, fuel loads are high, and the terrain is steep. This combination makes it difficult for firefighters to keep escape routes open and exposes them to unacceptable risks. Furthermore, such areas are typically far from structures and close to natural fire breaks, such as rivers and cliff walls, making confinement both the safest and most cost- effective response.

The most common method used at Amistad NRA to suppress wildfires is to pump water from the adjacent lake or river and spray it onto the fire. Firefighters rarely need to construct fire lines. In the history of the park, aviation resources (i.e., airplane or helicopter support) have never been used for firefighting, and park staff do not anticipate that they will be required in the future.

Regardless of whether a control, contain, or confine suppression strategy is used, the goals of AMR are to keep fires as small as possible and to extinguish them as quickly as possible, considering safety and cost as the paramount factors.

Prescribed fires and other fuel reduction methods are not utilized under Alternative A.

Mitigation Included in Alternative A

Currently, no mitigation measures are taken to reduce impacts on resources.

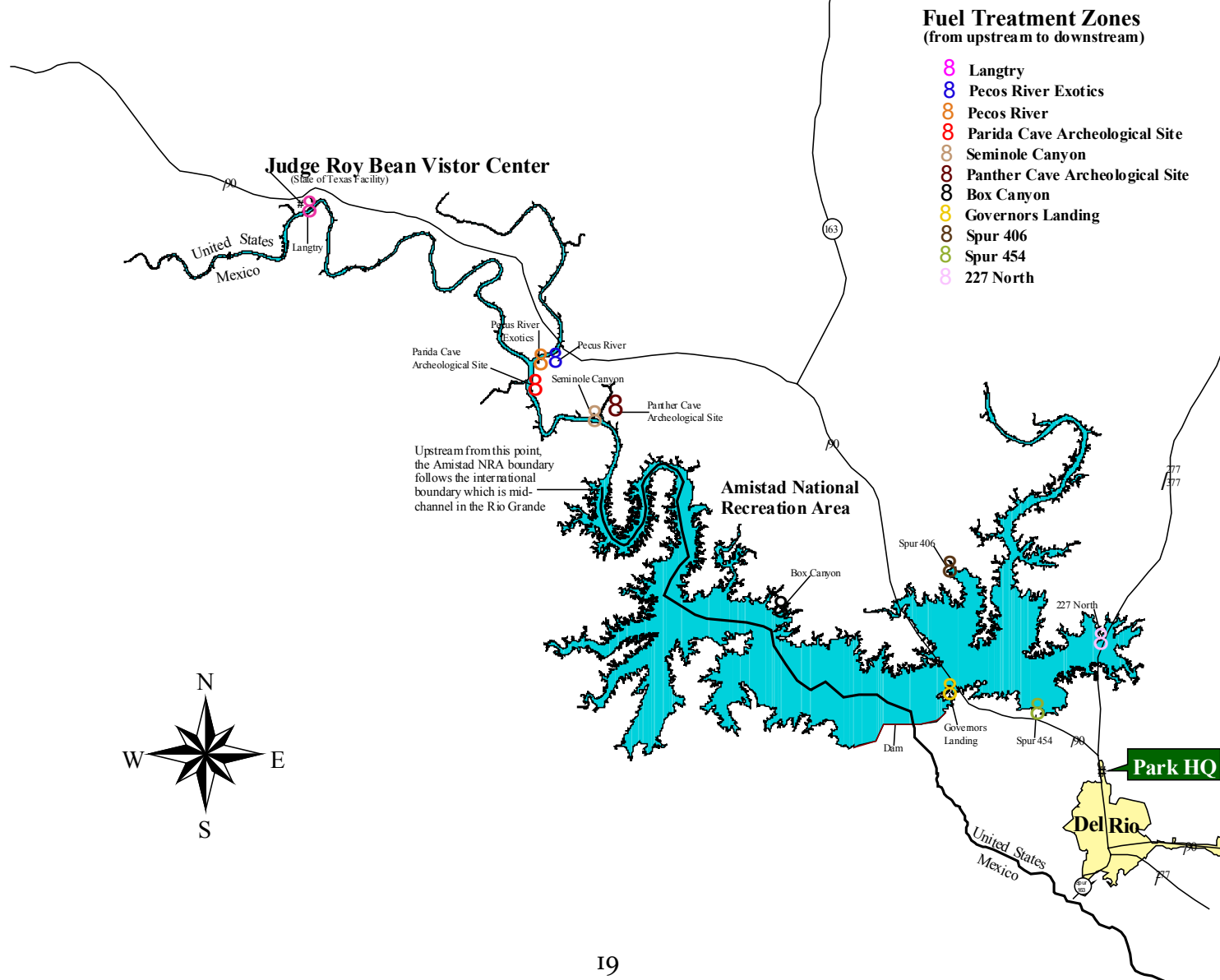
Alternative B: AMR/ Prescribed Fire Program

Under this alternative, AMR will continue to be the primary focus of the fire management program. However, National Park Service staff will also be empowered to utilize a range of fire management tools, including prescribed fire and manual and mechanical fuel reduction, to accomplish management objectives. The entire park will be managed as a single Fire Management Unit. A tentative schedule for prescribed fires over the next ten years is presented in Table I. Figure 4 shows the locations of these areas. Whether or not this schedule is adhered

Table 1. Plan for Fuel Treatment Activities Under Alternative B, 2005- 2014.

Year	Location	Treatment Method
2005	None	None
2006	277 North, Swim Beach 1	Prescribed Fire
	Parida & Panther Cave Archeological Site	Manual Reduction
2007	Pecos River, Boat Ramp 1	Prescribed Fire
	Governors Landing, Swim Beach 2	Prescribed Fire
	Spur 406, Boat Ramp	Manual Reduction
2008	Spur 454, Boat Ramp 2	Prescribed Fire
	Pecos River, Exotics	Prescribed Fire
2009	Langtry- Rio Grande, Hazard Fuel	Prescribed Fire
	Seminole Canyon- Rio Grande, Exotics	Prescribed Fire
2010	Pecos River, Boat Ramp 1, 2 nd Entry	Prescribed Fire
	277 North, Swim Beach 1, 2 nd Entry	Prescribed Fire
2011	Governors Landing, Swim Beach 2, 2 nd Entry	Prescribed Fire
	Parida & Panther Cave Archeological Site, 2 nd Entry	Manual Reduction
2012	Box Canyon, Boat Ramp 3	Prescribed Fire
2013	Spur 454, Boat Ramp 2, 2 nd Entry	Prescribed Fire
	Pecos River, Exotics, 2 nd Entry	Prescribed Fire
2014	Langtry- Rio Grande Hazard Fuel, 2 nd Entry	Prescribed Fire
	Seminole Canyon- Rio Grande, Exotics, 2 nd Entry	Prescribed Fire

Figure 4. Locations of Planned Fuel Treatment Activities Under Alternative B.



to will largely depend on the reservoir level, because these prescribed burns can only be conducted when the lake level is below conservation level since all are designed to take place within the inundation zone.

Suppression of Wildland Fires Using AMR

Wildland fires will be managed the same way under both alternatives. All wildland fires, regardless of whether they are natural or human- caused, will be managed using AMR. Under Alternative B, protecting large, native trees will be a top priority when planning suppression efforts. In addition, impacts to cultural resources will be considered for all fire management activities, including suppression. Minimum Impact Suppression Tactics (MIST) that do not cause ground disturbance will be heavily favored.

Structure and Resource Protection

Fuels have accumulated around some park structures, placing these structures at risk in the event of a wildland fire. Under Alternative B, manual and mechanical fuel reduction measures may be used to reduce fuels immediately adjacent to park structures and facilities.

Cultural resources can be damaged during fire management activities in several ways. Firefighters who have not been instructed in National Park Service policies may remove artifacts they find at sites exposed by fire. Firefighters may inadvertently destroy artifacts with hand tools or bulldozers while constructing fire control lines. In addition, wildland fires can expose previously hidden resources, making them vulnerable to theft by unscrupulous members of the public.

Alternative B will include educating firefighters involved in any fire activities at Amistad NRA about NPS policy requiring that artifacts remain where found. The Cultural Resources Program Manager will coordinate with the Fire Management Officer to pre-plan fire management efforts. Known archeological sites in the area of a wildland fire or prescribed fire, or a non- fire fuel reduction area, will be identified on a map and prioritized, and firefighters will be directed to take actions that will best protect those sites. Finally, firefighters will be instructed to take note of any new archeological sites exposed by fire and report them to the Cultural Resources Program Manager. The Cultural Resources Program Manager can then assess whether any measures are required to protect the new site.

Grasslands for Boats

Due to lower than normal reservoir water levels over the last decade, shrubs and small trees have encroached around some boat access points. As water levels return to normal, these shrubs and trees may become dangerous underwater snags that could pose a safety hazard to boats and make some access points completely unusable. In the past, shrub encroachment has rendered some boat docks in the park useless. Beaches may also be negatively impacted by shrub encroachment.

Under Alternative B, prescribed fires (fires that are intentionally set by park staff or other qualified personnel in order to achieve some specific goal) may be used to reduce brush and promote grassland near boat access points to ensure that boats will be able to utilize these areas safely as water levels fluctuate, as well as to keep beaches open. Alternatively,

manual or mechanical methods may be used, which would involve the use of backhoes, shredders, sling blades, and/or chainsaws to clear small trees, shrubs, and tall grasses that have grown up around boat launch facilities during low water levels. Brush piles would then be burned. Cleared areas would be monitored for erosion control until new growth stabilizes the soil. Regardless of which methods are used, brush clearing will be confined to areas that are periodically inundated by the reservoir.

Integrated Non- Native Plant Control Program

Prescribed fire may be used as part of an integrated non- native plant control program to control giant reed and tamarisk along the Lower Pecos River and the Rio Grande. These plants typically grow in dense, monotypic stands. Prescribed fire could be used to clear areas that have been overrun by giant reed and tamarisk, after which herbicide would be applied to kill the plants. Prescribed fire could also be used to remove the dead plants after herbicide has been applied in order to clear space for native plants to become established. This Environmental Assessment does not cover the use of herbicide as part of this program, only the potential use of prescribed fire.

Mitigation Included in Alternative B

Colonies of the federally endangered interior least tern, which build nests in open areas near water, may temporarily abandon their nests in order to fend off firefighters who are too close to the nesting area. Prior to engaging in firefighting activities, firefighters will be directed to stay away from any known least tern nesting colonies, and will be taught how to identify these highly conspicuous colonies. In addition, when feasible, prescribed fires will be conducted between September and April, when interior least terns are not present in the park, in order to reduce the potential impact of fire management activities on this species to the greatest extent possible.

A reasonable effort will be made to survey the affected area prior to prescribed burn ignitions in order to remove any state- protected species, such as Berlandier's tortoises, that could potentially be injured or killed by the fire. All state regulations regarding prescribed fires will be followed. Finally, any impending prescribed fires will be publicized on both sides of the U.S.- Mexico border, and efforts will be made to warn people who may be concealed in dense vegetation to leave the area prior to initiating a prescribed fire.

Alternatives Considered but Dismissed

Park staff identified an additional alternative that was considered but dismissed. This alternative includes features of Alternative B, but also allows some wildland fires to burn. The park would be divided into two Fire Management Units (FMUs). One unit would encompass areas of the park near structures and other developments. In this FMU, all wildfires would be suppressed using AMR. The other FMU would cover the more remote areas of the park. In this area, wildland fire use would be permitted. Wildland fire use involves allowing naturally ignited wildland fires to burn under certain conditions in order to achieve management goals.

This alternative was rejected for several reasons. First, because the park boundary follows a contour line, rather than a natural boundary such as a ridgetop or canyon bottom, it would be difficult to allow a wildland fire to burn while ensuring that the fire remains within the park. The park is mostly surrounded by private lands and developing a joint strategy for dealing with wildland fire with multiple landowners is not feasible. Secondly, none of the identified fire management goals and objectives can be accomplished solely via wildland fire use. Finally, most of the park consists of highly disturbed areas where fire is unlikely to be able to play an important ecological role due to reservoir water level fluctuations and overgrazing by trespass sheep and goats. Wildland fire does not naturally play a significant ecological role in most riparian areas. In fact, fire data from 1991 to 2001 indicate that no natural wildland fires occurred in the park during that period; all were human- caused (NPS data). Therefore, there is no compelling ecological reason to seek to return wildland fire to the landscape.

Environmentally Preferred Alternative

The environmentally preferred alternative is the alternative that causes the least damage to the environment and best protects, preserves, and enhances historic, cultural, and natural resources. The National Environmental Policy Act (NEPA) identifies the following six criteria to be used in evaluating which alternative is the environmentally preferred one.

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations
2. Ensure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings
3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences
4. Preserve important historic, cultural, and natural aspects of our natural heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice
5. Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources

Under Alternative A, prescribed fire and other fuel reduction methods cannot be used to fulfill management objectives. Fuels will continue to accumulate, resulting in increased risk to property and cultural resources over time. Therefore, Alternative A does not fulfill Criterion 1 (succeeding generations will face increased amounts of non- native plant species, to the detriment of native species, due to a lack of control efforts), Criterion 2 (structures will be at greater risk due to fuel accumulation and submerged woody vegetation will pose a safety hazard to boats), Criterion 3 (increased safety risk as described for Criterion 2, and inability to use prescribed fire may negatively affect efforts to control non- native plant species), or Criterion 4 (archeological sites will be at

increased risk due to lack of coordination with the Cultural Resources Program Manager).

Because the main resource at the park contributing to the experience of visitors is the lake itself, Criterion 5 is not directly addressed by Alternative A. However, because visitors rely on boat ramps to access the lake and these boat ramps may have to be closed if vegetation around them is not cleared, Alternative A could indirectly result in a reduced quality of life for visitors. Finally, if the park's biodiversity is viewed as a renewable resource, Criterion 6 is not met under Alternative A because without an integrated non- native plant control program, native species will continue to lose ground in the park.

Under Alternative B, more fire management tools are available, enabling the park to use prescribed fire and manual and mechanical fuel reduction techniques to accomplish management objectives such as improving public safety, reducing the threat to natural and cultural resources, and controlling non- native plant species.

As such, Alternative B does a better job of fulfilling all six criteria than Alternative A. Fuel loads will be reduced, decreasing the long- term risk to visitor safety, structures, and cultural resources. Also, fire can be used to promote biodiversity by playing a role in eliminating non- native species.

Summaries of Alternatives

The following tables provide comparative summaries of the features of the alternatives (Table 2), how well they meet the project goals (Table 3), and the impacts associated with each alternative for the impact topics included in the analysis (Table 4).

Table 2. Features of Alternatives

Component	Alternative A	Alternative B (NPS preferred)
Prescribed fire	Not permitted.	Permitted to accomplish resource management objectives and improve public safety.
Manual/ mechanical fuel reduction	Not done.	Used to reduce fuels around structures and boat access points.
Wildland fire use	Not permitted.	Same as Alternative A.
Fire suppression	All wildland fires are suppressed using AMR.	Same as Alternative A.

Table 3. How Each Alternative Meets Project Goals

Objective	Alternative A	Alternative B (NPS preferred)
Protect life and property.	Meets goal to some degree by use of AMR, but increases the long- term risk to life and property by allowing fuels to accumulate near structures inside the park.	Meets goal by reducing fuels that could destroy structures and using AMR to combat wildland fires.
Maintain boat access points and beaches.	Meets goal to some degree, but woody vegetation will likely force the closure of several boat access points as lake level rises, and may reduce enjoyment of beaches, reducing the park's value as a recreation area.	Meets goal by clearing areas around boat access points and beaches as water levels fluctuate.
Protect sensitive cultural and biological resources.	Meets goal to some degree by suppressing fires before they become uncontrollable. However, long- term threat to these resources increases as fuels accumulate. Furthermore, protection of cultural and biological resources is not taken into account and therefore resource damage is likely.	Meets goal by maximizing protection of sensitive cultural resources; large, native trees; and endangered species when considering wildland fire suppression strategies.
Support an integrated non-native plant control program.	Does not meet goal. Due to the density of the non-native vegetation, program implementation may be impossible without fire.	Meets goal by permitting the use of prescribed fire to clear areas overrun by non-native plants.

Table 4. Summary Comparison of Impacts

Impact Topic	Alternative A	Alternative B
Public and Staff Safety	There should be negligible to minor adverse effects to firefighters and property over the short- term through the use of AMR. However, in the future there will likely be short- term and long- term, minor to moderate adverse effects as fuels continue to build up near structures, increasing the fire risk to these structures over time.	The use of AMR should result in short- term, minor adverse effects to firefighters and property, as in Alternative A. However, there will likely also be a long- term, moderate beneficial effect as fuel loads are reduced around structures.
Visitor Experience	There will likely be a long- term, moderate adverse effect as boat access points are permanently closed due to shrub growth.	There may be a short- term, minor adverse effect as boat access points may be briefly closed to remove brush. However, there should be a long- term, moderate beneficial effect as shrubs are removed, ensuring that boat access points can remain open as water levels rise.
Cultural Resources	Minor to moderate adverse effects are likely, as fires will occasionally occur in areas with fragile archeological resources. The risk of adverse effects increases over time as wildland fires and fire suppression affect different areas.	This alternative will have minor to moderate beneficial effects because important archeological sites will be better protected due to coordination with the Cultural Resources Program Manager. However, there is also some risk of minor to moderate adverse impacts during prescribed fires set as part of the non- native plant control program.
Vegetation	Over the short term, there should be negligible to minor, short- term adverse effects to vegetation from wildland fires. Keeping wildland fires from	Over the short term, same as Alternative A. There will likely be a moderate beneficial effect as an integrated non- native plant management program

	<p>becoming widespread in riparian areas should have a minor beneficial effect to riparian plant species. However, there will likely be a moderate adverse effect over the long term because integrated non-native plant management programs to control tamarisk and giant reed will be less effective without the use of prescribed fire. Also, rare biological resources, such as large native trees, will be at greater fire risk without an effort to protect them.</p>	<p>controls tamarisk and giant reed in some areas. Large native trees will be better protected due to a new focus on suppressing wildland fires that could threaten them.</p>
Wildlife	<p>Some minor beneficial effects accrue as AMR is used to keep fire from becoming widespread in riparian areas used by wildlife and animals are at lower risk of being injured or killed by fire. Also a long- term minor to moderate adverse effect as tamarisk and giant reed remain uncontrolled.</p>	<p>Same minor beneficial effects as in Alternative A. Clearing shrubs to reduce fuel loads around vulnerable resources may have negligible to minor adverse effects on some species. Minor to moderate beneficial effect as tamarisk and giant reed stands are replaced by native vegetation.</p>

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section is organized by impact topic. For each topic, we describe the existing conditions and resources at the park. Then, we describe the environmental consequences, or potential impacts, on the natural, cultural, and human environment at Amistad NRA that could result from implementation of the two alternatives considered in this EA.

Impact Assessment Methodology

General Methodology

For each topic, the impact analysis follows the same general approach. The environmental consequences of each alternative are explained in terms of:

- context (are effects site- specific, local, or regional?);
- intensity (are effects negligible, minor, moderate, major, or constituting impairment?);
- duration (are effects short- term or long- term?); and
- timing (do the effects vary with the timing of alternative actions?).

The levels of intensity and effect duration are specifically defined for each impact topic. Each alternative is analyzed in terms of direct, indirect, and cumulative effects as well as the potential for impairment. Direct effects occur at the same time and place as the action. Indirect effects occur later in time or are farther removed from the area, but are reasonably foreseeable. Cumulative effect assessment and impairment are described in more detail below. Each effect is further categorized as either adverse or beneficial. Finally, there is a summary of the major findings at the end of each impact topic section.

Cumulative Effects Analysis

The Council on Environmental Quality (CEQ) regulations for implementing NEPA require assessment of cumulative effects in the decision- making process for federal projects. Cumulative effects are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non- federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects are considered for both alternatives.

Actions with the potential to have a cumulative effect in conjunction with this project include the following:

- The park is currently creating a General Management Plan, and alternatives may call for additional boat ramps, access points, campgrounds, or picnic areas.
- Reservoir water levels will continue to fluctuate dramatically over time due to drought and dam management.
- Housing developments along the park boundary are likely to increase over time.
- Illegal grazing by hundreds to thousands of trespass sheep and goats occurs within the park boundary.
- Visitation may increase as immigration from other parts of the United States and Mexico increase the population of the area.

Impairment Analysis

NPS Management Policies (NPS 2001) requires analysis of potential effects to determine whether actions would impair park resources or values. The fundamental purpose of the NPS, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, actions that would adversely affect park resources and values.

These laws give the NPS discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values.

Impacts that lead to impairment, in the professional judgment of the NPS/ UA team, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Impairment may result from NPS activities in managing the park, from visitor activities, or from activities undertaken by concessionaires, contractors, and others operating in the park. An impact is more likely to constitute impairment if it has a major or severe adverse effect upon a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

A determination on impairment is included in the impact analysis section for all impact topics relating to park resources and values.

Impact Topic #1: Public and Staff Safety

Public and staff safety must be the top concern for any fire management program. Although fire can be used to help achieve management goals, it can also pose a serious threat to human life and property. There is always an element of risk to firefighters whenever they are engaged in suppression or conducting a prescribed fire. In 2002, 22

firefighters were killed nationwide while working at or responding to wildland fires or prescribed fires (LeBlanc and Fahy 2003).

Wildland fires are uncommon at Amistad NRA. Between 1980 and 2001, 51 wildland fires were recorded in the park, an average of 2.3 fires per year. The number of fires recorded each year varied from zero to six. Between 1991 and 2001, fire start dates included every month of the year except October and November. February had the most fire starts (six), followed by June (five).

The largest park fire between 1980 and 2001 burned 200 acres. This fire occurred in January 1998. The second largest burned just 36 acres in the park, but several fires also covered land outside the park boundary. Over half (53%) of the wildland fires occurring between 1991 and 2001 burned 0.1 acres or less of park land. Between 1991 and 2001, the longest-lasting fire burned for 17 days. The next longest fire lasted for six days. Over half (56%) of the fires were put out or went out the first day they were detected.

The probable cause of each fire was noted for fires occurring between 1991 and 2001. All of the fires were ignited by people; none were lightning fires. Most wildland fires in the park fall into two general categories. Some fires occur along the Rio Grande, most likely as a result of campfires started by foreign nationals illegally crossing the river into the U.S. There are many dense stands of tamarisk and giant reed along the river in this area, which provide plenty of fuel for wildland fires. However, high cliffs also line most of the river, making the fires relatively easy to control unless wind conditions are extreme. Some fires in this area may be intentionally started by local farmers, ranchers, or hunters, on either side of the border, who burn the tamarisk and giant reed in order to be able to access the river more easily.

The other group of wildland fires occurs near high visitor use areas, especially campgrounds. These fires are typically started by park visitors, either as a result of an escaped campfire or the use of fireworks.

Although fuel connectivity in the park is generally low, if fuels are permitted to continue to build up, fires could potentially damage structures. In addition to a Visitor Information Center and an Administration Building, both located along Highway 90 south of the reservoir and outside the park, the National Park Service owns structures (Figure 5) within the park at:

- Rough Canyon developed area
- San Pedro Campground
- Black Brush Point Picnic Area
- Diablo East developed area
- Governors Landing Picnic Area
- the Pecos River developed area, near the Highway 90 bridge
- 277 North Campground

In the event that wildland fires cross the park boundary, efforts will be made to protect structures on surrounding lands.

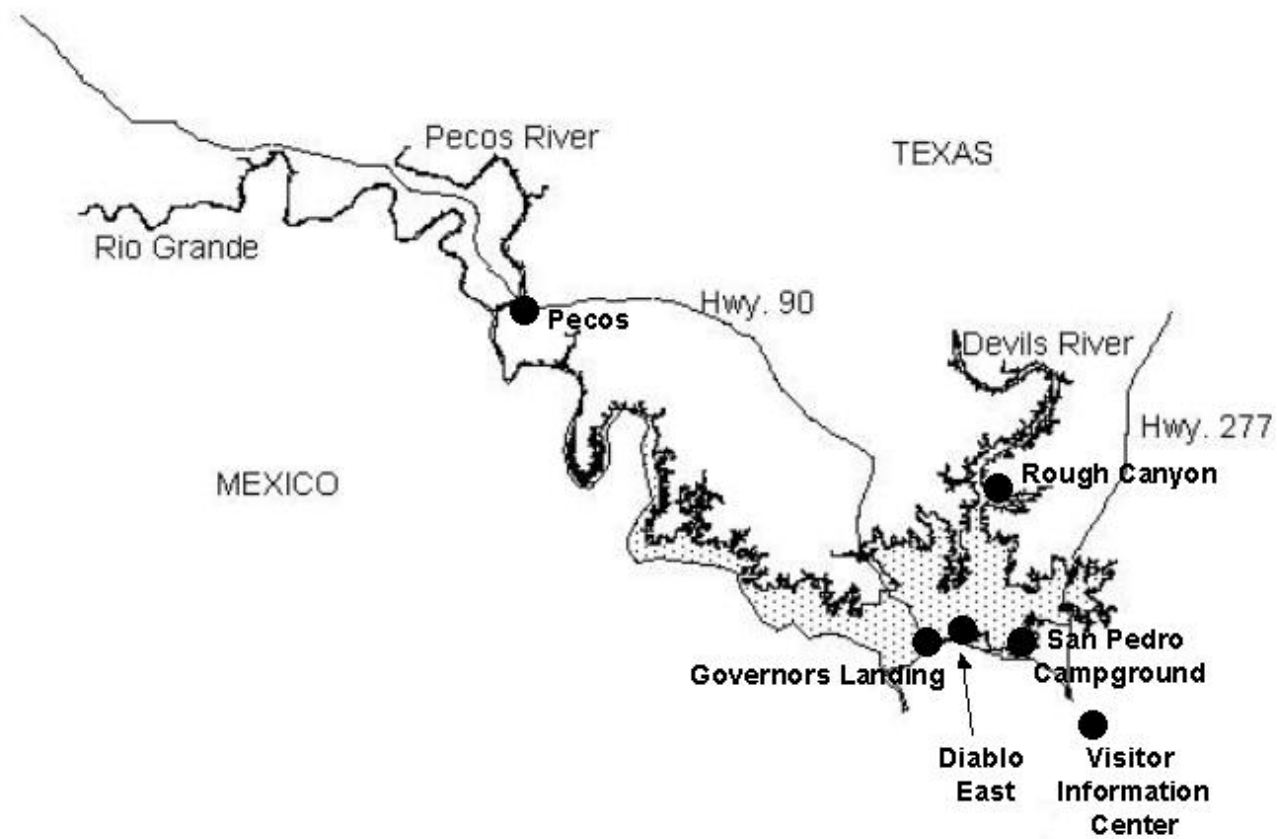


Figure 5. Locations of Structures at Amistad NRA.

Impact Topic Analysis

The area considered under this impact topic includes the entire park because wildland fire can occur anywhere. More specifically, this topic focuses on firefighters, park staff, visitors, and public structures within the park. This assessment is based upon past experience with firefighting operations in the park and knowledge of current fuel conditions.

Intensity Threshold Criteria

Negligible	No appreciable effect on public and staff safety, with no injuries, loss of life, or loss of property.
Minor	A detectable impact, but no serious effect on public and staff safety. Few or minor injuries, no loss of life, and limited property damage.
Moderate	Readily apparent impact. Substantial effect on public and staff safety on a localized scale, some serious injuries, no loss of life, and localized property damage or destruction.
Major	Readily apparent impact. Substantial effect on public and staff safety throughout the entire area, serious injuries and loss of life, extensive property damage or destruction.

Impact Duration Definitions

Short-term	Effects last for the duration of the fire management action.
Long-term	Effects continue after the fire management action has been completed.

Impact Analysis – Alternative A (No Action)

Under Alternative A, AMR is applied to all wildland fires. There will be no measures taken to eliminate or reduce fuels around structures.

Over the short term, given that wildland fires in the park typically remain small and easy to control, there should be negligible to minor adverse effects to firefighters and property, depending upon the location and size of the wildland fire. The use of AMR should keep the risk to firefighters fighting wildland fires small, while the suppress/confine strategy should be generally effective in keeping the fires themselves small. However, in the future, short-term and long-term minor to moderate adverse effects can be expected as fuels continue to build up around structures, increasing the risk of fire damage over time.

Cumulative Impacts

If new structures are constructed within the park, they will also be at risk over time as fuels accumulate around them. Increased recreational use over time could result in more escaped campfires and increased use of fireworks near structures, which, combined with fuel buildup, will increase the risk to public and staff safety.

Conclusion

The use of AMR to combat all wildland fires should result in negligible to minor short-term adverse impacts. However, as time goes on, there may be moderate adverse effects to health, life, and property under Alternative A because fuels will be permitted to build up unabated around structures. Alternative A would not produce any major adverse impacts or impairment of public or staff safety whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; key to the natural or cultural identity of the park or opportunities for enjoyment of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impact Analysis – Alternative B (NPS preferred)

Under Alternative B, AMR will be applied to all wildland fires, as under Alternative A. In areas where fuels have built up to potentially dangerous levels around structures, the park will utilize manual and mechanical methods to reduce fuels and create fire breaks.

Prior to any prescribed fires conducted to fulfill other management objectives, the park will make a concerted effort to publicize the planned burn on both sides of the U.S.-Mexico border and to ensure that anyone concealed in dense vegetation in the burn area is warned.

Over the short term, the effects should be the same as Alternative A; there will likely be negligible to minor adverse effects as AMR is used to combat wildland fires. However, as fuels are reduced in places where they pose potential threats to structures utilized by park staff and the public, we can expect to eliminate, or at least substantially reduce, the moderate adverse effects that are likely to occur over the long term under Alternative A.

Cumulative Impacts

Same as Alternative A, except increased visitation will pose less of a risk to public and staff safety in terms of wildland fire because fuels around buildings will be reduced.

Conclusion

Alternative B permits the park to reduce or eliminate the potential for long-term moderate adverse effects due to fuel buildup. Alternative B would not produce any major adverse impacts or impairment of public or staff safety whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; key to the natural or cultural identity of the park or opportunities for enjoyment of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impact Topic #2: Visitor Experience

Amistad NRA was created to provide the public with recreation opportunities. Visitors to the park can engage in a variety of activities, including camping, wildlife viewing, picnicking, horseback riding, swimming, scuba diving, and hiking. During the hunting

season, visitors with the proper state license and a permit from the park may hunt deer, dove, quail, waterfowl, turkey, rabbit, javelina, mouflon sheep, and aoudad sheep. However, Amistad NRA is best known for its boat- related activities, such as fishing, sightseeing, and water skiing.

In 2003, over 1,150,000 people visited Amistad NRA; most came to the park to use boats. The reservoir level has fallen well below conservation level (1,117 feet) in recent years, exposing land that is becoming submerged again as the reservoir returns to conservation level (Figure 6). When these lands are underwater again, the shrubs and small trees growing on them will become hazardous snags that could potentially damage watercraft.

Although it is not feasible or desirable to clear this entire area of woody vegetation, some lake access points could be rendered unusable if they are not cleared. In the past, boat ramps have been permanently closed due to shrub encroachment during periods of low water levels. Amistad NRA boat ramps (Figure 7) are located at:

- the U.S. Air Force Southwinds Marina
- Diablo East
- Black Brush Point
- Spur 454
- Box Canyon
- the Pecos River near the Highway 90 bridge
- Rough Canyon
- Spur 406
- 277 North
- 277 South

Impact Topic Analysis

The area considered under this impact topic is the entire park. However, there is special emphasis on boat access points, which provide the gateway many visitors require in order to have a rewarding and enjoyable experience. This assessment is based upon visitor use patterns and past experience with the consequences of fluctuating water levels on visitor experience.

AMISTAD RESERVOIR LEVEL 1968 - 2004

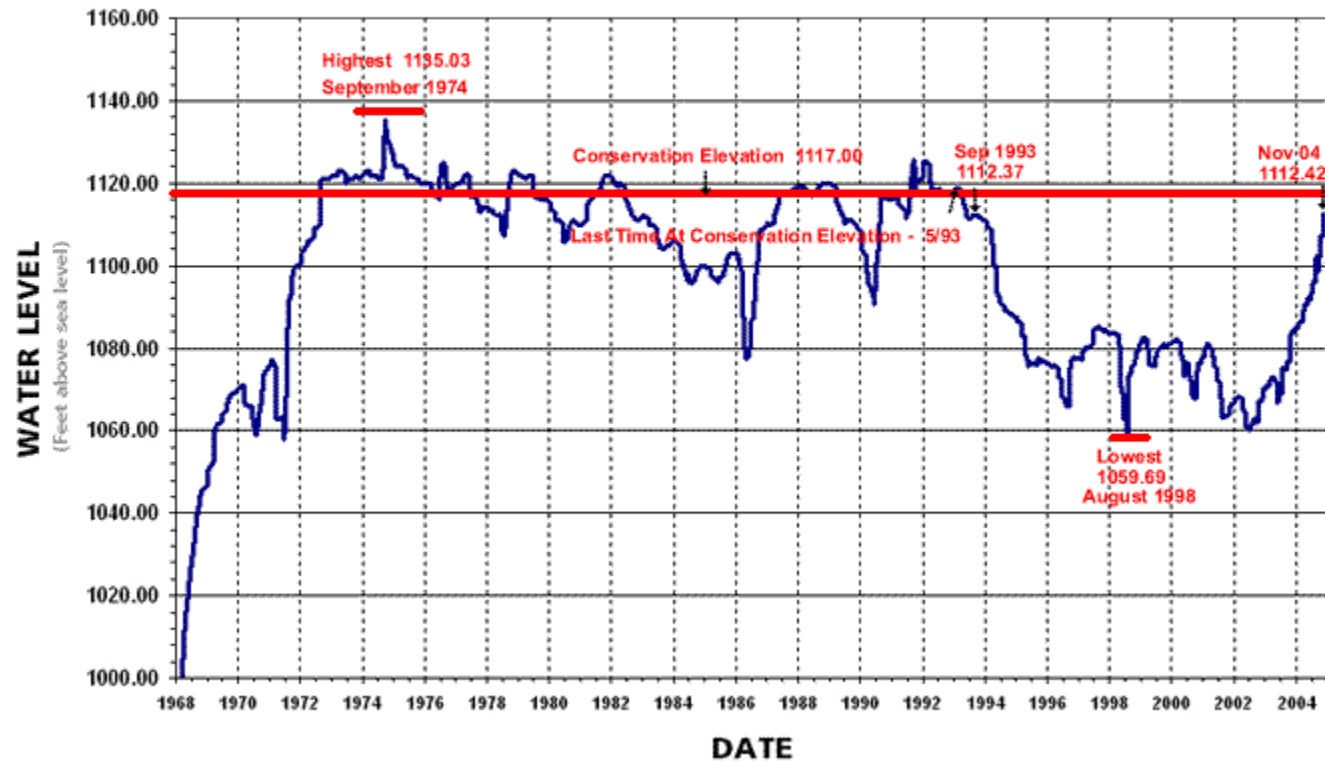


Figure 6. Water Level of Amistad Reservoir, 1968- 2004. Since the reservoir was created, water elevation has ranged from 1,135 feet in 1974 to 1,060 feet in 1998. The reservoir has been continuously below conservation level since June 1993, but is now approaching conservation level again.

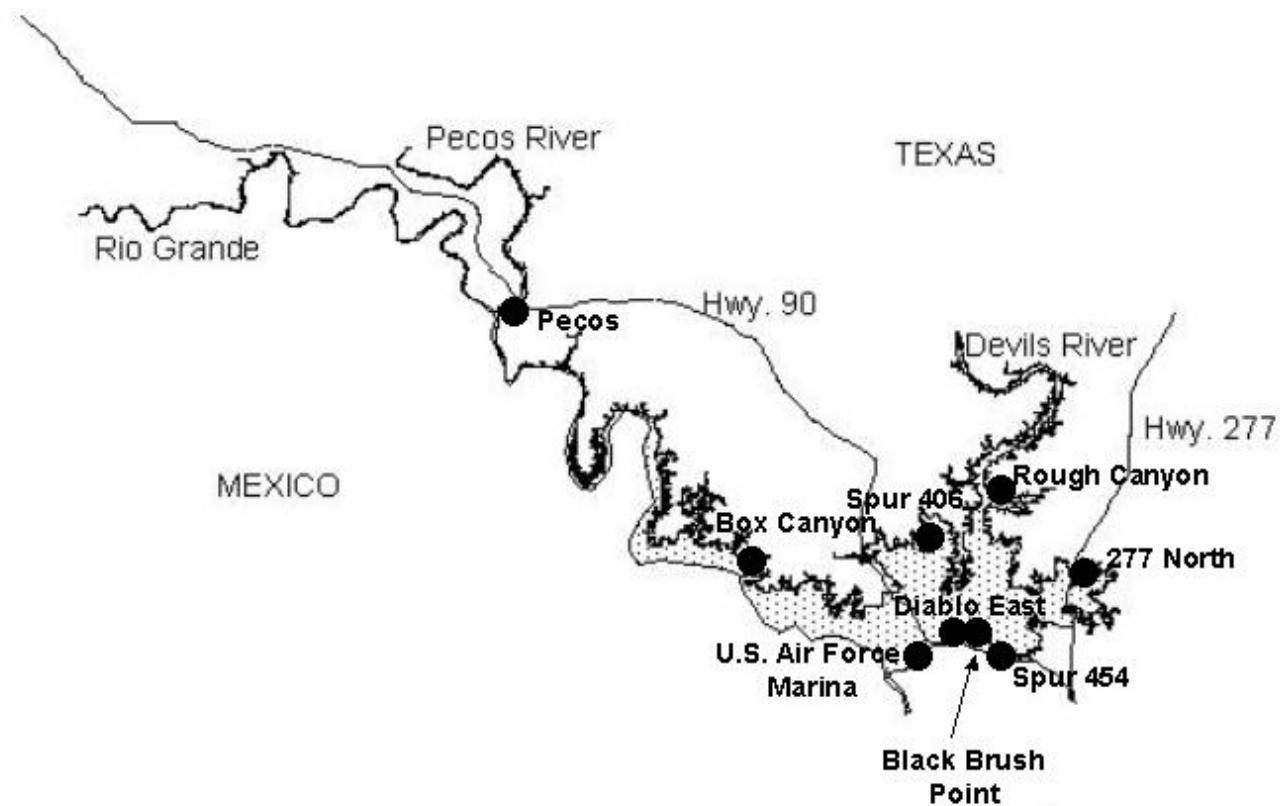


Figure 7. Locations of Boat Ramps at Amistad NRA.

Intensity Threshold Criteria

Negligible	Changes in visitor use or experience would not be detectable, or only be barely detectable.
Minor	Small changes in visitor use or experience would be detectable, but the effects would be slight and would not prohibit visitors from having a rewarding and enjoyable experience.
Moderate	Changes in visitor use or experience would be readily apparent. Many visitors would not be able to enjoy the park in the way they had anticipated.
Major	Changes in visitor use or experience would be readily apparent. Most or all visitors would not be able to enjoy the park in the way they had anticipated. Mitigation efforts would be unlikely to succeed.

Impact Duration Definitions

Short-term	Effects last for the duration of the fire management action.
Long-term	Effects continue after the fire management action has been completed.

Impact Analysis – Alternative A (No Action)

Under Alternative A, AMR is applied to all wildland fires. Given that no wildland fires have ever necessitated the closure of any part of the park to visitors, these actions will likely continue to have short- term and negligible or minor adverse effects on visitor experience. However, no actions are planned under this alternative to reduce or eliminate woody vegetation around boat access points or swimming beaches, which could result in reduced access to the lake in the future, a long- term, moderate adverse impact to visitor experience.

Cumulative Impacts

Continued water level fluctuations will exacerbate the threat to boat access areas. If visitation increases, visitors may require the use as many access points as possible and visitor experience may be adversely affected to a greater extent than otherwise if some access points must be closed due to vegetation buildup.

Conclusion

Wildland fires are not likely to greatly impact visitor experience, given the history of wildland fire in the park. However, some boat access points may have to be closed and swimming beaches may become less enjoyable as water levels rise if the brush currently growing around them is not reduced. Under Alternative A, which does not call for clearing this vegetation, there may be long- term moderate adverse effects as visitors have reduced options for accessing the lake. Alternative A would not produce any major adverse impacts or impairment of visitor experience whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; key to the natural or cultural identity of the park or opportunities for enjoyment of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impact Analysis – Alternative B (NPS Preferred)

Under Alternative B, AMR is applied to all wildland fires. As under Alternative A, this should only have a short- term, negligible to minor adverse impact on visitor experience. One component of Alternative B calls for clearing enough brush around boat access points and swimming beaches to ensure that they remain open. This action will either involve (1) manual or mechanical removal of brush, followed by the burning of brush piles, or (2) prescribed fires over an area around the boat access point. These actions may necessitate the temporary closure of a boat access point or beach. As a result, there may be a short- term, minor adverse impact on visitor experience. However, the long- term, moderate adverse impact caused by the permanent closure of these access points can be avoided under this alternative. Instead, there will be a long- term minor to moderate beneficial impact as visitors retain all of their options for utilizing the lake.

Cumulative Impacts

Continued water level fluctuations will mean that brush will periodically have to be cleared around access points during periods of low water levels throughout the foreseeable future. If visitation increases and all access points experience greater use, fuel reduction operations will have to be more carefully timed to keep them from negatively affecting visitor experience.

Conclusion

Under Alternative B, which calls for reducing vegetation to keep access points open, there may be some short- term minor adverse impacts while the action is taking place, but this will lead to long- term minor to moderate beneficial effects for visitor experience. Alternative B would not produce any major adverse impacts or impairment of visitor experience whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; key to the natural or cultural identity of the park or opportunities for enjoyment of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impact Topic #3: Cultural Resources

Amistad NRA is located within the Lower Pecos River region of southwest Texas. This geographic area has one of the densest concentrations of Archaic rock art in the New World. The area is especially known for its polychromatic pictographs. Although the early inhabitants of the area did not construct any permanent structures or raise crops or livestock, they did leave pictographs ranging up to 16 feet in height, animal remains, textiles, bone and wooden artifacts, and plant materials in the rock shelters they inhabited, providing evidence of human habitation extending back for 12,000 years.

By the time the U.S. Army began to establish outposts in the area in the late 1840s, the Apache, Kiowa, and Kickapoo had moved into the region, replacing the last of the local Native American groups. Developed by the U.S. Army for both military and commercial purposes, the San Antonio- El Paso road became a target of raids by bandits and roving Native Americans groups, resulting in an increased military presence and several

skirmishes within the boundaries of the present-day park during the second half of the 19th century. Following increasingly aggressive tactics by the U.S. Army, including raids on Native American villages in Mexico, and the completion of the Southern Transcontinental Railroad in 1883 (which ran through the present-day park), settlers began to use the area intensively for livestock grazing. By the early decades of the twentieth century, Val Verde County had become one of the largest wool and mohair producers in the United States.

Amistad NRA manages approximately 1,900 known historic and prehistoric archeological sites. The sites are scattered around the 540-mile shoreline of Amistad Reservoir, which includes portions of the Devils, Pecos, and Rio Grande valleys. Although many more sites were inundated when Amistad Reservoir was created, other important sites remained above water. Internationally known sites include Panther Cave and Parida Cave. Over 300 major rock art sites are known to be located within or immediately adjacent to the park, some dating back as far as 3,500 to 4,000 years before present. The park is also home to Bonfire Rockshelter, North America's oldest known prehistoric bison jump site, dating back almost 9,000 years.

There are four National Register of Historic Places Archeological Districts encompassing 182 individual sites that are at least partially within the park. Mile Canyon was listed in 1970 and covers 1,500 acres. Lower Pecos Canyon, listed in 1971, covers 34 acres. Rattlesnake Canyon, listed in 1971, covers one acre. Seminole Canyon was listed in 1971 and covers 14,170 acres. The historic railroad ruins and prehistoric rock art that put Seminole Canyon on the National Register are located on state and private lands. No contemporary Native American groups have expressed an interest in managing ethnographic resources or participating in environmental management issues at Amistad NRA.

Reservoir level fluctuations, which can be as great as 4-6 inches per day, pose the greatest threat to park cultural resources that are not permanently underwater. Wave action resulting from high winds can also severely erode archeological sites. Presently, theft and vandalism at these sites seem to be a rare occurrence.

Fire or fire management activities could result in the destruction or loss of some archeological resources. Obviously, cultural resources are non-renewable resources. Once damaged or destroyed, they cannot be replaced. Therefore, special efforts are required to ensure that these resources are adequately protected.

Rock art, arguably the most important archeological feature in the area, is known to be extremely sensitive to the effects of fire (BLM 1999). Pictographs, which are painted on rock, can be burned away, whereas petroglyphs, which are chipped into rock, can be damaged or destroyed by exfoliation during fires (NWCG 2001). Stone artifacts can shatter, ceramics may become severely altered, and organic materials (such as pollen grains, clothing, and leather) can be completely consumed by fire (NWCG 2001). Furthermore, fires can make radiocarbon dating of artifacts inaccurate (NWCG 2001). A study conducted in New Mexico revealed that approximately 50% of ceramic artifacts within burn areas were altered by fire (Lentz et al. 1996).

The location of artifacts will greatly affect the potential for damage. Artifacts buried under soil may be unaffected by an understory fire. However, in a New Mexico fire, some artifacts were damaged at a depth of 20 cm (Lentz et al. 1996). Typically, inorganic materials will be damaged or destroyed at temperatures exceeding 300°C, although ceramics may withstand temperatures greater than 600°C (NIFC no date). Generally, the hotter the fire, the greater the risk to cultural resources. Fires also expose new sites, adding to the park's body of cultural resources information, but making those sites subject to vandalism and theft, as well as damage due to weathering.

Fire management activities can pose an even greater threat to cultural resources than the fires themselves. Firefighters may inadvertently damage or destroy archeological resources by using hand tools or heavy machinery such as bulldozers to construct fire line. Firefighters may also remove artifacts if they are not familiar with National Park Service policies.

Impact Topic Analysis

In addition to NEPA, Section 106 of the National Historic Preservation Act (NHPA) has specific requirements regarding the protection of cultural resources. To comply with the NHPA, the Cultural Resources Program Manager has completed a cultural matrix that identifies each type of resource found in the park, the fire- related risk to that resource, the fire management objective, and finally, how that type of resource can best be protected under the fire management program. This matrix was approved by the Texas State Historic Preservation Office on July 22, 2004. The matrix can be found in Appendix B.

Archeological resources are found throughout the region. Therefore, the area considered under this impact topic includes the entire park. This assessment is based upon archival research, the experience of the Cultural Resources Program Manager, and his familiarity with park resources.

Intensity Threshold Criteria

Negligible	Little to no noticeable impact on cultural resources.
Minor	A noticeable impact to a single element of a single site.
Moderate	Readily apparent impact to a significant characteristic of a site or sites that does not greatly diminish or eliminate the cultural resource value of that site.
Major	Readily apparent impact to a significant characteristic of a site or sites to the point that cultural resource value of the site is greatly diminished or eliminated.

Impact Duration Definitions

Because they are non- renewable resources, there can be no short- term impacts to cultural resources; all effects will be long- term.

Impact Analysis – Alternative A (No Action)

Under Alternative A, wildland fires will be combated as they occur using AMR. Generally, AMR efforts at the park do not involve the construction of fire lines or other activities likely to directly damage artifacts. Instead, water is pumped from the lake to douse the fire, which should have negligible to minor adverse effects on any archeological resources present. However, fire lines may occasionally be used to combat fires and no special efforts are made to protect cultural resources.

Although every effort will be made to keep wildland fires small and confined, there are archeological sites throughout the park, and the fires could have a minor to moderate adverse impact on sites. The most important parts of the sites listed in the National Register of Historic Places are not located in the park, so the park has limited ability to protect those resources. However, as fuels build up around fragile sites, those sites are at an increasingly greater risk of moderate adverse impacts.

New archeological sites will be exposed as wildland fires clear vegetation. Exposure may make these sites more susceptible to damage by weathering. Furthermore, depending upon what elements are revealed and the location of the site, some resources may be threatened by removal by firefighters or the public. This could potentially have a minor to moderate adverse effect.

Cumulative Impacts

Over time, cultural resources will continue to be adversely impacted by water level fluctuations. Sites exposed by wildland fires may be less protected from the effects of these fluctuations. However, under Alternative A, this impact is minimized because wildland fires are kept as small as possible.

Conclusion

Under Alternative A, wildland fire and fire suppression can be expected to have minor to moderate impacts on cultural resources over time. Alternative A would not produce any major adverse impacts or impairment of cultural resources whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; key to the natural or cultural identity of the park or opportunities for enjoyment of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impact Analysis – Alternative B (NPS Preferred)

Although both alternatives use AMR to combat wildland fires, protection of cultural resources is given special emphasis under Alternative B. The FMP will emphasize the danger that fire line construction poses to cultural resources, and these lines will only be constructed if absolutely necessary. All fire management activities will be closely coordinated with the Cultural Resources Program Manager, who will advise the Incident Commander regarding the best way to protect any sites that are at risk. This should reduce the likelihood that wildland fire will have moderate adverse impacts on cultural resources, thereby providing a moderate benefit. Furthermore, firefighters will be educated about National Park Service rules regarding the removal of artifacts, and the

locations of new sites will be made known to the Cultural Resources Program Manager, who can then determine whether theft of artifacts by the public is likely to be an issue and suggest an appropriate action.

Another component of Alternative B involves using prescribed fire as part of a non-native plant management program. Fire would potentially be used to clear dense thickets of tamarisk and giant reed. These areas will be difficult to survey prior to ignition due to the thickness of the vegetation. Therefore, we cannot rule out the possibility that there could be minor to moderate adverse effects. However, efforts can be made to manually reduce fuels around any previously known archeological sites within the burn area prior to ignition.

Cumulative Impacts

Water level fluctuations will continue to adversely impact cultural resources. Cultural resources may be more susceptible to damage from water level fluctuations as a result of reduced vegetative cover following wildland fires, prescribed burns, or brush removal. There could potentially be minor to moderate adverse impacts. Close coordination with the Cultural Resources Program Manager will help to reduce the potential for adverse impacts.

Conclusion

Alternative B has several components that could impact cultural resources. Coordinating wildland fire suppression efforts with the Cultural Resources Program Manager should reduce the risk of adverse impacts, providing a minor to moderate benefit to those sites. The use of mechanical equipment to create fire breaks protecting structures or to clear woody vegetation around boat ramps could damage archeological resources. Prescribed fires, used as part of a program to control non-native plants and clear boat ramp areas, also have the potential to cause damage. However, the risk of damage under all of these components can be reduced significantly by coordinating all activities with the Cultural Resources Program Manager, enabling people engaged in fire management activities to exercise extreme care when they are near known sites. Alternative B would not produce any major adverse impacts or impairment of cultural resources whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; key to the natural or cultural identity of the park or opportunities for enjoyment of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impact Topic #4: Vegetation

A general description of the vegetation at Amistad NRA, based on data collected by Poole (2004), follows. Scientific names of all plants and animals mentioned in this document can be found in Appendix A.

- **Limestone hill shrubland**
Dry, rolling limestone hills that surround Amistad Reservoir (above the inundation zone) are dominated by blackbrush, ceniza, and guajillo shrubs. This is the most common plant community in the park. Texas persimmon, Vasey oak,

plateau live oak, Texas paloverde, goatbush, narrowleaf elbowbush, evergreen sumac, fairy duster, poreleaf, calderona, Lindheimer rockdaisy, scented lippia, shrubby blue sage, Wright's spikemoss, beebrush, Roosevelt weed, King Ranch bluestem, and red threeawn are locally common in some areas.

- **Rock outcrops**

Rock outcrops throughout the park are sparsely vegetated by many of the species in the above category, in addition to rocky goldaster and baccharisleaf penstemon above the inundation zone and frogfruit, tree tobacco, and chastetree within the inundation zone.

- **Desert scrub**

The west side of the park includes areas dominated by Chihuahuan Desert vegetation, such as lechuguilla, sotol, and ocotillo.

- **Mesquite woodland**

Mesquite trees and shrubs dominate some areas of both the upland and formerly inundated parts of the park, often in association with huisache, beebrush, Roosevelt weed, spiny hackberry, and ceniza.

- **Lake shrubland**

Huisache trees and shrubs dominate areas below the upland zone that were formerly inundated by the reservoir, but have been exposed for some time. Roosevelt weed, mesquite, and beebrush, as well as non- native species such as tamarisk, King Ranch bluestem, and Bermuda grass, are also common in this zone.

- **Lakeshore grassland**

Areas that have only been exposed by the reservoir for a relatively short time are mostly dominated by Roosevelt weed, as well as non- native King Ranch bluestem and tamarisk.

- **Ephemeral shoreline community**

The areas most recently exposed by the reservoir are typically dominated by frogfruit, Bermuda grass, and water hyssop.

- **Shoreline reed community**

Common reed, giant reed, and switchgrass can be found in areas along the river and lake shorelines.

- **Riparian community**

Riparian areas that are not greatly affected by the lake, such as the uppermost section of the Devils River, provide habitat for many native plants, such as spikesedge, California bulrush, Roosevelt weed, and creek indigo.

- **Aquatic plant community**
Completely aquatic plant communities include one dominated by native American waterwillow in the upper Devils River, and one dominated by non-native hydrilla within the lake.
- **Oak- pistachio motte**
Finally, a native vegetation association that is very rare in the United States, dominated by Graves oak and Texas pistachio, occurs in Pink Cave Cove and possibly a few other isolated pockets.

In addition to the drastic environmental changes caused by the creation of Amistad Reservoir and subsequent water level fluctuations, overgrazing by sheep and goats has eliminated grass cover from much of the park and shrub density has likely increased. Although grazing is not legal in the park, the park boundary is not fenced and hundreds, if not thousands, of sheep and goats still inhabit the park.

Jackie Poole, Texas Parks & Wildlife Department, conducted a botanical survey of Amistad NRA in 2002 and 2003. She did not find any federally protected plants. She did find one state species of concern, cliff bedstraw, in the Pecos area. This species grows on cliff faces, where it is unlikely to be affected by fire management activities.

She also found a record of another state species of concern, Rydberg's Indian breadroot, from Castle Canyon. When the plant was found, Castle Canyon had been inundated by the reservoir, so the plant was growing on an island. Despite searching for this plant in Castle Canyon, Jackie Poole did not locate it during her 2002- 03 survey. Islands are unlikely to be affected by fire management activities in any way.

Although there are no records of the species from the park and it was not found during the 2003 survey, there is a possibility that one federally endangered plant species, Tobusch fishhook cactus, occurs in the park. If present, this species would occur in relatively open areas outside of the inundation zone. Because all prescribed fires are planned for within the inundation zone, and manual and mechanical removal of vegetation will only take place where fuel buildup is very high near structures (areas that are not relatively open), implementation of the Fire Management Plan will have no impact on this species.

The park's vegetation has been, and will continue to be, dramatically affected by large reservoir water level fluctuations. Nonetheless, there are areas that contain vegetation that is rare or especially important for the area. Large, native trees, in particular, compose a resource that park staff wants to protect. Graves oak, Vasey oak, and Texas pistachio trees are found in Pink Cave Cove. Large plateau live oak trees occur in a drainage between Hunt Area 4 and 277 North.

Far more common than unique native vegetation, however, are the non- native plants that have taken advantage of the disturbance caused by rapidly changing shorelines as water levels have risen and fallen. Three non- native plant species have become dominant at Amistad NRA. Two of these species, tamarisk and giant reed, can be found almost park- wide, but are especially abundant along the Rio Grande west of Seminole

Canyon and along the Pecos River south of the Highway 90 bridge. The third species is buffelgrass, which can be found in disturbed areas throughout the park. All three of these species tend to form monotypic stands that not only reduce plant diversity, but also provide less value to wildlife as food and habitat than native plant species. All three species are also well adapted to fire.

Natural wildland fires are typically uncommon in riparian areas (Busch 1995). Therefore, native riparian plants generally do not respond well to fire, and fire can lead to major changes in riparian plant community structure, typically favoring non- native species, such as tamarisk and giant reed (Busch and Smith 1993; Busch 1995). These non- native plants produce dense masses of above ground stems and leaves that can become highly flammable. As a result, they tend to increase fire frequency in riparian areas. Giant reed rhizomes, which are typically not damaged during fires, quickly produce new, rapidly growing shoots following a fire that can outgrow native species (Bell 1986). Tamarisk can regrow from roots or buried stem fragments following fire (Carpenter 1999). In this way, fire helps these non- native plants out- compete native vegetation.

Buffelgrass, native to Africa and Asia, has been widely introduced in Texas for cattle forage. In addition to crowding out native plants, buffelgrass also increases the fire frequency in systems that are not fire- adapted because it is very flammable and recovers quickly after fire (Tu 2002). Therefore, like tamarisk and giant reed, buffelgrass uses fire to out- compete native plants.

The park may undertake a non- native plant control program that would include, along with other measures that are not considered in this document, conducting prescribed fires to clear areas of tamarisk and giant reed. However, fires can also promote the spread of the three non- native plants of concern.

Impact Topic Analysis

Large, native trees are confined to a few upper canyon reaches where there is adequate water but flooding by the reservoir is infrequent or does not occur. Tamarisk and giant reed can be found along much of the park's shoreline, but are most common along the Rio Grande west of Seminole Canyon and along the Pecos River south of the Highway 90 bridge. However, non- native plant control efforts involving the use of prescribed fire are currently only being considered for the Pecos River infestation. Other non- fire treatments that could affect vegetation involve clearing brush around structure and boat access points. These are the areas specifically considered under this impact topic. However, because wildland fires can occur anywhere, the entire park is also considered generally.

This assessment is based upon the knowledge of park staff, as well as scientific literature regarding the effects of fire on non- native and native riparian vegetation, including Bell 1986, Busch 1995, Busch and Smith 1993, Carpenter 1999, and Tu 2002.

Intensity Threshold Criteria

Negligible	Individual plants may be killed, but there is no noticeable impact to plant populations.
Minor	Measurable but local impact to plant populations. Does not affect biodiversity at the park level.
Moderate	Widespread impact to plant populations. Will affect the number of species or species composition at the park level.
Major	Widespread impact to plant populations inside and outside the park. May result in permanent extirpation of some species from the park.

Impact Duration Definitions

Short-term	Effects last for less than one year.
Long-term	Effects continue for more than one year.

Impact Analysis – Alternative A (No Action)

Under Alternative A, the impact of wildland fires on vegetation will be minimized through the application of AMR. Negligible to minor adverse short- term effects are likely in most areas affected by wildland fires. Keeping wildland fires from becoming widespread in riparian areas should have a minor beneficial effect on riparian plant species. However, the potential exists for moderate adverse long- term effects to isolated populations of large, native trees. Despite efforts to keep fires small, the abundance and distribution of non- native plants is likely to increase over the long- term due, in part, to wildland fires. Existing large stands of non- native plants will continue to expand due to a lack of control efforts.

Cumulative Impacts

Disturbance caused by water level fluctuations and intense grazing by sheep and goats will continue to favor the establishment and spread of non- native plant species at the expense of native plants. This problem could be exacerbated by increased visitation, as there will be more vectors for spreading non- native plant seeds. Also, increased visitation may result in an increase in wildcat roads created by visitors using 4- wheel drive vehicles, creating more disturbed areas suitable for non- native species. In combination with disturbance caused by wildland fires, there could ultimately be long- term moderate adverse impacts on native plant species.

Conclusion

Generally, wildland fires should only have negligible or minor adverse impacts on vegetation over the short- term. However, under Alternative A, large native trees will be at an increased risk of extirpation from the park because they are not currently considered when making suppression decisions. Fires may increase the distribution and abundance of non- native plants over the long term, which could have a long- term minor to moderate adverse effect on native plants. Alternative A would not produce any major adverse impacts or impairment of vegetation whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the

park; key to the natural or cultural identity of the park or opportunities for enjoyment of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impact Analysis – Alternative B (NPS Preferred)

The effects of using AMR to fight wildland fires will be the same as under Alternative A. However, under Alternative B, protecting large native trees at Pink Cave Cove and in the drainage between Hunt Area 4 and 277 North during fire suppression efforts will be a top priority, which should have a moderate beneficial effect on their survival. The use of prescribed fire as part of an integrated non- native plant control program to eliminate stands of tamarisk and giant reed should have a moderate beneficial effect on native plant species along the Lower Pecos River. Other wildland and prescribed fires that are not part of this program may have the side effect of promoting non- native plants, especially buffelgrass. Efforts to reduce fuels around structures and boat access points are likely to have a negligible to minor adverse impact on vegetation. The use of prescribed fire around boat access points should reduce shrub cover and increase grass cover.

Cumulative Impacts

As under Alternative A, water level fluctuations, intense grazing, and potentially increased visitation will continue to promote non- native plant species at the expense of native plant species, and both wildland fires and prescribed fires are likely to contribute to establishment of non- native plants throughout the park. However, the use of prescribed fire in conjunction with herbicide, as part of an integrated non- native plant control program, should help to counter this trend by actively destroying non- native plants and facilitating the re- establishment of native species in treated areas.

Conclusion

Under Alternative B, large native trees will be better protected than under Alternative A. Fires may increase the distribution and abundance of non- native plants over the long term, which could have a long- term minor to moderate adverse effect on native plants. Under Alternative B, the spread of some non- native plants can potentially be combated by using fire in combination with herbicides as part of a non- native plant control program, which will improve ecosystem health. Other fuel management activities included in Alternative B, such as clearing vegetation around structures and boat access points, should have a negligible to minor adverse impact on vegetation. Alternative B would not produce any major adverse impacts or impairment of vegetation whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; key to the natural or cultural identity of the park or opportunities for enjoyment of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impact Topic #5: Wildlife

Thorough inventories of the biological resources at Amistad NRA have just begun as part of a nationwide inventory and monitoring program for all national parks. Amistad NRA

is located at the junction of three biological provinces – the Chihuahuan Desert, Tamaulipan Chaparral, and Balconian (Edwards Plateau). As a result, biodiversity of the area is expected to be high, and the area is at the range limit for several species, including the state- threatened Berlandier's tortoise and state- threatened Texas indigo snake. Amistad NRA is also an important breeding site for the federally endangered interior least tern.

Due to the frequent perturbations and constantly changing land area as a result of fluctuations in the reservoir level, we expect that species adapted for disturbance are common, and many species are probably temporary residents, moving in and out of the park as conditions become more or less favorable. Generally speaking, these traits should reduce the likelihood that fire will have important adverse effects on the park's biological resources.

Nonetheless, the flooding associated with the completion of the Amistad Dam caused the extinction of one species of fish, the Amistad Gambusia. Most likely, other species have been extirpated from the park as a result of the dam. The sensitive species that remain may require special care.

Seven federally protected species occur or could potentially occur in the park. Because an initial analysis revealed that none of these species are likely to be adversely affected by either alternative, the NPS/ UA team has not prepared a formal Biological Assessment. A Biological Assessment is a document used to evaluate the effects of a proposed action on federally listed species that is submitted to the U.S. Fish & Wildlife Service (USFWS) for concurrence (USFWS/ NMFS 1998). Instead, after informal consultation, the regional USFWS office in Austin, TX advised the NPS/ UA team to simply address the potential impacts to these species in this section of the EA, and then submit the EA to USFWS for evaluation (J. Milliken, USFWS, pers. comm.). Furthermore, USFWS directed the team to classify the predicted impact on each federally listed species into one of the following categories:

- Beneficial effect
- No effect
- May affect, not likely to adversely affect
- May affect, likely to adversely affect

The NPS/ UA team also contacted the Texas Parks and Wildlife Department (TPWD) for input regarding state- listed species that could potentially be affected by fire or fuel management activities. TPWD responded with a list of state- listed species known to occur in Val Verde County and, when available, locality information.

Below is a general overview of the park's fauna and an examination of the potential impacts of fire and fuel management activities on individual federally and state- protected species. Following is a formal impact analysis of each alternative on wildlife generally using the same format utilized to analyze the other impact topics. Scientific names of all plants and animals mentioned in this document are listed in Appendix A.

Birds

In 2000, 39 bird species were captured in mist nets at Amistad NRA as part of a bird banding study. Because waterbirds, shorebirds, and raptors cannot be captured in mist nets and the mist nets were only employed at a single site, there are surely many more than 39 bird species that use the park either as a permanent or seasonal home, or as a stop on a migration route. An earlier study documented 161 bird species at Amistad NRA, although some of these records only include observations of birds seen flying over or near the park (LoBello 1976).

The federally endangered interior least tern breeds at Amistad NRA. Approximately 80 to 160 least terns arrive at the Amistad Reservoir each year around May 1 and nest inside the park. They leave the park around the middle of August. Their preferred nesting habitat at the reservoir is a gravelly surface with little or no vegetation on islands recently emerged due to lowering water levels. However, they occasionally nest in similar habitat along the shoreline, and as the reservoir level has dropped, some of the nesting islands have become connected to the mainland.

Females each deposit two or three sand-colored eggs in their shallow nests that are typically well-camouflaged against the nest substrate (Campbell 1995). Least terns nest colonially, probably as an anti-predator defense. When disturbed, the birds in the colony fly off their nests and dive at the intruder while cackling loudly. This behavior makes nesting colonies very conspicuous.

Frequency of disturbance can affect breeding success, because when the adults are fending off an intruder, the eggs are exposed to other predators and cannot be properly protected from direct sunlight or from cool temperatures (Campbell 1995; Sidle and Harrison 1990). People may unwittingly crush eggs when traveling through a nesting area because the eggs are well-camouflaged. At Amistad NRA, the large, sometimes extremely rapid fluctuations in the reservoir level also pose a threat.

Because least terns feed in the water and nest in sparsely vegetated or unvegetated areas, they are unlikely to be directly affected by any fire management activities. However, the colonies nesting on the shoreline of the mainland could potentially be indirectly affected by firefighters working in the area. Park staff have noted that boats do not disturb the birds, but people on foot near a nesting area will provoke a response. The presence of firefighters could cause least terns to leave their nests in order to “attack” the firefighters, or firefighters walking through nesting areas on their way to a fire could accidentally trample the well-camouflaged eggs. There is no information regarding the effects of smoke, if any, on the breeding success of this species.

Amistad NRA staff conduct surveys for least tern nesting colonies throughout the reservoir each year. Prior to engaging in firefighting activities, firefighters will be advised to stay away from any known least tern nesting colonies, and will be taught how to identify these highly conspicuous colonies. In addition, when possible, prescribed fires under Alternative B will be conducted between September to April, when least terns are not present in the park. Because it is unlikely that any fire management activities will

occur near nesting colonies, and given that firefighters can be easily trained to avoid the colonies, either alternative **may affect, but is not likely to adversely affect** this species.

Three other federally threatened and endangered bird species have been infrequently observed in the park - the black- capped vireo, brown pelican, and bald eagle. Only a single black- capped vireo has ever been observed at Amistad NRA, most likely passing through to a known nesting area north of the park. Brown pelicans have been observed infrequently in the reservoir. Bald eagles have been observed along cliffs in the winter. None of these species are known to nest in the park, and therefore fire management activities **may affect, but are not likely to adversely affect** these species.

The federally threatened piping plover and federally endangered whooping crane are known from the general area, but have not been observed in the park. Whooping cranes do not nest in Texas (Campbell 1995), but could potentially visit the park during the winter. Piping plovers are also only present in Texas during the winter and prefer sparsely vegetated shoreline areas unlikely to be affected by fire management activities (Campbell 1995). Because neither species has ever been observed in the park, fire and fuel management activities should have **no effect** on either species.

State- endangered peregrine falcons were observed near Amistad Dam on several occasions in the early 1990s. This species was removed from the federal endangered species list in 1999. No nesting falcons have been observed in the park. These birds typically construct nests on ledges on cliff faces. Three state- threatened white- faced ibises were observed in the park in 1975, but have not been documented since. The birds observed were not nesting.

A state species of concern, the snowy plover, was observed nesting in the park in 1995 and 2000. These birds nest in the same areas favored by interior least terns. A pair of Mexican hooded orioles, also a state species of concern, was observed in 1994, although it is unclear whether these birds were in or adjacent to the park. Given that all four of these species are either rarely observed in the park, or nest in areas that are not susceptible to fire, they should not be negatively impacted by fire management activities.

Reptiles and Amphibians

During 2003- 04, a two- year reptile and amphibian inventory was conducted at Amistad NRA. During this inventory, 45 reptile and amphibian species were documented within the park boundary (D. Prival, unpublished data). An earlier study documented or found historic records of 77 reptile and amphibian species in or near the park (LoBello 1976). However, the researchers conducting the current study estimated that there are probably only 55 reptile and amphibian species within the park boundary at present.

Four state- threatened species were found during the inventory – the Texas horned lizard, Texas indigo snake, Trans- Pecos black- headed snake, and Berlandier's Tortoise. Texas horned lizards prefer open, sparsely vegetated areas (Conant and Collins 1998). Texas indigo snakes were typically found in canyon bottoms near cliff faces with crevices. Generally, the species is found near areas with permanent water (Werler and Dixon 2000). Trans- Pecos black- headed snakes spend almost all of their time

underground or under cover (Werler and Dixon 2000). No live Berlandier's Tortoises were found during the survey, but fragments of a shell were found within the park boundary. This tortoise is most likely to favor grassy areas of the park.

Texas horned lizards are unlikely to be directly impacted by fire because they inhabit areas that cannot burn. However, they tend to rely on their camouflage, rather than attempting to flee, when faced with a threat, which makes them susceptible to death or injury from vehicles or foot traffic. Therefore, increased human activity related to fire management activities could increase the likelihood that some individuals will be killed. Texas indigo snakes are typically found in areas with cliff face crevices or near water, where they would probably be safe from fire. Trans- Pecos black- headed snakes are excellent burrowers and are typically underground, where they should receive at least some protection from fire.

Berlandier's tortoises often remain above ground under a clump of vegetation when resting, as opposed to some other North American tortoises that typically construct burrows in which they rest (Conant and Collins 1998). Due to this behavior, Berlandier's tortoises are at risk from wildland fire or prescribed fire. This risk can be reduced if areas selected for prescribed fire are surveyed prior to the burn, as called for under Alternative B, and removed from the area prior to ignition.

The state- threatened reticulate collared lizard could potentially occur at Amistad NRA, because the park is on the edge of its range (Conant and Collins 1998). However, during the inventory, five eastern collared lizards (not a state- listed species) were found, but no reticulate collared lizards.

Mammals

In 2003, a mammal inventory began at Amistad NRA. During this first year, 33 species were documented (M. Bahm, pers. comm.). An earlier study documented 57 mammal species in or near Amistad NRA, based upon observations and historical records (LoBello 1976).

State- threatened black bears have been occasionally, but rarely, observed passing through the park. There are no records of any permanent resident bears at Amistad NRA. The last recorded sighting occurred in 1994. Due to their high mobility and apparently limited use of the park, fire management activities are not expected to adversely affect this species.

In 1999, colonies of cave myotis bats and Yuma myotis bats were found in the park, as was a single pale Townsend's big- eared bat. A hairy- legged vampire bat was found in the park in 1967, the only U.S. record of this species. All of these bats are state species of concern and were found in various tunnels along a river. Although lone bats are unlikely to be adversely affected by fire management activities, bat maternity colonies in these tunnels could theoretically be disturbed by smoke from nearby fires.

Fish

A fish inventory for the park is scheduled to begin in the near future (R. Slade, pers. comm.). An earlier study documented 65 fish species in the park, based on observations and historical records (LoBello 1976).

Devils River minnows, a federally threatened species, have not been documented in the park, although they are known from areas nearby. The primary threats to Devils River minnow populations are habitat modification due to the impoundment of water by dams, and possibly predation by smallmouth bass, an introduced game fish (64 CFR 56596- 56609). The species is typically found in fast- flowing streams and rivers. Because the species has never been found in the park, and the only potential habitat occurs in areas where only fire suppression/ confinement is planned, the proposed action should have **no effect** on this species.

Four state- listed fish are known or suspected to occur at Amistad NRA. Blue suckers were found in the reservoir by the Texas Parks and Wildlife Department in 1978 or 1979. The species prefers rivers with moderate currents, but sometimes inhabits deep lakes as well (NMGFD 2002). The Rio Grande darter was found in the park in 1974 according to the Texas Biological and Conservation Data System, while the Proserpine shiner was found in the park in 1975 by Rick LoBello (LoBello 1976). There are no additional recent records from within the park for these species. The Conchos pupfish has never been documented at Amistad NRA, but is known from areas near the park.

It is unlikely that any of the small fires that could occur in the park during the tenure of the fire management plan will result in measurably increased sedimentation, increased water temperatures, or otherwise alter the river characteristics. Therefore, we do not expect that any fish species will be impacted.

Invertebrates

No information is available regarding the park's invertebrates, and no invertebrate inventory work has been scheduled or budgeted for. However, no federally or state listed invertebrates are known to occur in Val Verde County.

Impact Topic Analysis

Generally speaking, rare and unusual wildlife is most likely to be found in the relatively undisturbed areas in the park's uppermost few miles of the Pecos and Devils Rivers. However, wildlife, included state- listed species, can be found throughout the park. Therefore, the area under consideration is the entire park.

This assessment is based upon the knowledge of park staff and the scientific literature referenced under this impact topic.

Intensity Threshold Criteria

Negligible	Some individuals could be affected, but any impact at the population level is well within the range of natural fluctuations.
Minor	Some populations may be affected over the short- term, but no long- term effects. The biodiversity of the park is not affected.
Moderate	Some wildlife populations could be affected over the long- term. Some species may leave or be extirpated from the park, but the long- term survival of the species range- wide is not threatened.
Major	Some species leave or are extirpated from the park, threatening the long- term survival of the species.

Impact Duration Definitions

Short- term	One generation of the species under consideration.
Long- term	Longer than one generation of the species under consideration.

Impact Analysis – Alternative A (No Action)

Under Alternative A, AMR will be applied to all wildland fires, which should minimize impacts to wildlife. Most species are thought to experience relatively limited mortality during wildland fires, although juvenile birds in nests; animals in shallow burrows; leaf litter invertebrates; and slow- moving animals (such as tortoises) caught in a fire's path are vulnerable (Smith 2000). There will likely be some negligible to minor short- term effects, adverse to some species, beneficial to others, as small areas of the park are cleared by wildland fire. Keeping wildland fires from becoming widespread in riparian areas should have a minor beneficial effect to wildlife. Non- native tamarisk and giant reed will continue to spread unabated, which will have minor to moderate long- term impacts on wildlife, as these plants provide habitat for fewer species than the native plants they replace (Bell 1986, Carpenter 1999).

Cumulative Impacts

Disturbance caused by water level fluctuations and intense grazing by sheep and goats will continue to have a negligible to moderate adverse impact on many wildlife species. Increased visitation could potentially have a minor adverse impact on some species due to increased pollution from boats and increased road mortality. The impact of wildland fires is likely to be very small compared to the impacts of these more widespread disturbances.

Conclusion

Over the long- term, the continued dominance of non- native tamarisk and giant reed under Alternative A will likely have minor to moderate adverse effects on wildlife. Alternative A would not produce any major adverse impacts or impairment of wildlife whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; key to the natural or cultural identity of the park or opportunities for enjoyment of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impact Analysis – Alternative B (NPS Preferred)

The impacts of wildland fires will be the same as under Alternative A. Clearing vegetation around structures and boat access points may have negligible to minor adverse effects on some species. These adverse effects will be minimized by walking the area prior to the burn to flush out or remove animals that could be killed, such as tortoises, when feasible. After vegetation has been cleared, species that prefer cleared areas or grasslands will likely experience a minor benefit, whereas species that prefer shrubs will experience a minor adverse effect in the treated area.

The use of fire as part of a non- native plant control program should have a minor to moderate beneficial effect on several species as tamarisk and giant reed are replaced with native plants that provide these species with habitat.

Cumulative Impacts

Cumulative impacts should be the same as under Alternative A. Even though there will be more disturbance from fire management activities under Alternative B than Alternative A, the amount of disturbance still will be small compared to that caused by water level fluctuations and grazing.

Conclusion

Because Alternative B calls for more disturbance than Alternative A, there are likely to be more short- term negligible to minor impacts, adverse to some species, beneficial to others, under Alternative B. However, over the long- term, the minor to moderate adverse effects on wildlife cause by non- native plants will be reduced under Alternative B. Alternative B would not produce any major adverse impacts or impairment of wildlife whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; key to the natural or cultural identity of the park or opportunities for enjoyment of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents.

CONSULTATION/ COORDINATION

The first internal scoping meeting for this project was held on June 20, 2003. Amistad NRA staff and National Park Service fire experts reviewed an NPS Intermountain Region Environmental Screening Form, identified important park resources, and began discussing options for fire management. Soon after, research specialists from the University of Arizona's School of Natural Resources were added to this team in order to assist with compiling information and writing the EA. The team (referred to in this document as the NPS/ UA team) began informal discussions with the U.S. Fish and Wildlife Service and the Texas Department of Parks and Wildlife on October 27, 2003 to identify species of concern, and contacted the Texas Commission on Environmental Quality on December 4, 2003 to identify air quality issues.

A second internal meeting was held on December 11, 2003 to develop goals and objectives and fire management alternatives, discuss impact topics, and assign tasks to participants. On February 5, 2004, a newsletter outlining the proposed alternatives and inviting comments was mailed out to 217 members of the public on the Amistad NRA mailing list. The same information was placed on the Amistad NRA web page. One comment was received.

A Cultural Resources Component matrix outlining steps that will be taken to protect cultural resources was submitted to the Texas State Historic Preservation Office and was approved on July 22, 2004.

A copy of this Environmental Assessment will be placed on the Amistad NRA web page during the review period, and a link to it will be placed on the Amistad NRA home page. Furthermore, letters stating that the EA is available for review and comment will be sent to the following organizations:

International Boundary and Water Commission
Seminole Canyon State Park
Texas Commission on Environmental Quality
Texas Nature Conservancy
Texas State Historic Preservation Office
Texas Parks and Wildlife Department
U.S. Fish & Wildlife Service
Val Verde County Rural Volunteer Fire Department

Agencies/ Tribes/ Organizations/ Individuals Contacted

Manuel Arrebondo, Texas Commission on Environmental Quality (Laredo, TX)
Matt Bahm, Sul Ross State University (Alpine, TX)
Jim Harrison, The Nature Conservancy (Dolan Falls Preserve, TX)
Jana Milliken, U.S. Fish & Wildlife Service (Austin, TX)
Jackie Poole, Texas Parks & Wildlife Department (Austin, TX)
Dorinda Scott, Texas Parks & Wildlife Department (Austin, TX)

Preparers

Alan Cox, Superintendent, Amistad National Recreation Area

Richard Gatewood, Fire Ecologist, Big Bend National Park

Brooke Gebow, Senior Research Specialist, School of Natural Resources, University of Arizona.

David Hays, Computer/GIS Specialist, Amistad National Recreation Area

Joe Labadie, Cultural Resource Specialist/Archeologist, Amistad National Recreation Area

Bruce Malloy, Chief Ranger, Amistad National Recreation Area

Mark Morgan, Management Assistant, Amistad National Recreation Area

John Morlock, Fire Management Officer, Big Bend National Park

Dave Prival, Senior Research Specialist, School of Natural Resources, University of Arizona, Tucson.

Rick Slade, Chief of Education and Resources Management, Amistad National Recreation Area

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APPENDIX A: COMMON AND SCIENTIFIC SPECIES NAMES

Amistad Gambusia (*Gambusia amistadensis*)
American Waterwillow (*Justicia americana*)
Baccharisleaf Penstemon (*Penstemon baccharifolius*)
Bald Eagle (*Haliaeetus leucocephalus*)
Beebrush (*Aloysia gratissima*)
Berlandier's Tortoise (*Gopherus berlandieri*)
Bermuda Grass (*Cynodon dactylon*)
Black Bear (*Ursus americanus*)
Blackbrush (*Acacia rigidula*)
Black- capped Vireo (*Vireo atricapillus*)
Blue Sucker (*Cycleptus elongatus*)
Brown Pelican (*Pelecanus occidentalis*)
Buffelgrass (*Cenchrus ciliaris*)
Calderona (*Krameria ramosissima*)
California Bulrush (*Schoenoplectus californicus*)
Cave Myotis Bat (*Myotis velifer*)
Ceniza (*Leucophyllum frutescens*)
Chastetree (*Vitex agnus*)
Cliff Bedstraw (*Gallium correlii*)
Common Reed (*Phragmites australis*)
Conchos Pupfish (*Cyprinodon eximius*)
Creek Indigo (*Indigofera lindheimeri*)
Devils River Minnow (*Dionda diaboli*)
Eastern Collared Lizard (*Crotaphytus collaris*)
Evergreen Sumac (*Rhus virens*)
Fairy Duster (*Calliandra conferta*)
Frogfruit (*Phyla nodiflora*)
Giant Reed (*Arundo donax*)
Goatbush (*Castela erecta*)
Graves Oak (*Quercus gravesii*)
Guajillo (*Acacia berlandieri*)
Hairy- legged Vampire Bat (*Diphylla ecaudata*)
Huisache (*Acacia minuata*)
Hydrilla (*Hydrilla verticillata*)
King Ranch Bluestem (*Bothriochloa ischaemum*)
Least Tern (*Sterna antillarum*)
Lechuguilla (*Agave lechuguilla*)
Lindheimer rockdaisy (*Perityle lindheimeri*)
Mesquite (*Prosopis glandulosa*)
Mexican Hooded Oriole (*Icterus cucullatus cucullatus*)
Narrowleaf Elbowbush (*Forestiera angustifolia*)
Ocotillo (*Fouquieria splendens*)
Pale Townsend's Big- eared Bat (*Corynorhinus townsendii pallescens*)

Peregrine Falcon (*Falco peregrinus*)
Piping Plover (*Charadrius melodus*)
Plateau Live Oak (*Quercus fusiformis*)
Poreleaf (*Porophyllum scoparium*)
Red Threeawn (*Aristida purpurea*)
Reticulate Collared Lizard (*Crotaphytus reticulatus*)
Rio Grande Darter (*Etheostoma grahami*)
Rocky Goldaster (*Heterotheca fulcrata*)
Roosevelt Weed (*Baccharis neglecta*)
Rydberg's Indian Breadroot (*Pediomelum humile*)
Scented Lippia (*Lippia graveolens*)
Shrubby Blue Sage (*Salvia ballotiflora*)
Smallmouth Bass (*Micropterus dolomieu*)
Snowy Plover (*Charadrius alexandrinus*)
Sotol (*Dasylirion texanum*)
Spikesedge (*Eleocharis* spp.)
Spiny Hackberry (*Celtis pallida*)
Switchgrass (*Panicum virgatum*)
Tamarisk (*Tamarix aphylla*, *Tamarix ramosissima*)
Texas Horned Lizard (*Phrynosoma cornutum*)
Texas Indigo Snake (*Drymarchon melanuras erebennus*)
Texas Paloverde (*Parkinsonia texana*)
Texas Persimmon (*Diospyros texana*)
Texas Pistachio (*Pistacia mexicana*)
Tobusch Fishhook Cactus (*Ancistrocactus tobuschii*)
Trans- Pecos Black- headed Snake (*Tantilla cucullata*)
Tree Tobacco (*Nicotiana glauca*)
Vasey Oak (*Quercus pungens* var. *vaseyana*)
Water Hyssop (*Bacopa monnieri*)
White- faced Ibis (*Plegadis chihi*)
Whooping Crane (*Grus americana*)
Wright's Spikemoss (*Selaginella wrightii*)
Yuma Myotis Bat (*Myotis yumanensis*)

APPENDIX B: CULTURAL RESOURCES COMPONENT

Amistad National Recreation Area Cultural Resource Component for Fire Management Plan

Introduction

Amistad National Recreation Area, Val Verde County, Texas (Figure 1), is in the process of creating a Fire Management Plan (FMP). The cultural resource component (CRC) for this plan identifies specific values and objectives for preserving and maintaining cultural resources in a desired state with regard to fire management strategies. *Values* are defined as the unique research and interpretive potential of cultural resources that are at risk from fire program activities. *Objectives* have been defined by considering possible fire management strategies and how each strategy might be used to benefit, maintain, or limit the loss of core values.

This analysis is especially important given the international significance of the many archeological and rock art sites within and immediately adjacent to park boundaries. The park manages approximately 1,900 known historic and prehistoric archeological sites scattered throughout three different river valleys that collectively have more than 540 miles of shoreline on the United States side of Amistad International Reservoir.

The canyons and river valleys managed by the park contain an unparalleled record of human prehistory that spans nearly 12,000 years (see Table 1). North America's oldest known prehistoric bison jump site is located within the park's legislated boundary. Four major prehistoric styles and three historic styles of pictographs are represented among the regions 300+ major rock art sites, with the oldest style tentatively radiocarbon dated as far back as 3,500- 4,000 years before the present. There are four National Register Archeological Districts located within or immediately adjacent to park boundaries that collectively list 182 prehistoric sites at the national level of significance.

The CRC should be viewed as an active component of the Fire Management Plan and used as a planning and operations guide to prevent resource loss or degradation. Once approved, the Cultural Resource Component (CRC) is a blanket compliance document for the duration of the Fire Management Plan (FMP).

Fire Management Plan Goals and Objectives

Cultural sites, structures, and artifacts are resources requiring actions with varying fire management actions and responses. The following cultural resources goals and objectives define what are considered to be appropriate fire management activities for specific cultural resource elements at Amistad National Recreation Area. These goals and objectives are consistent with the overall goals and objectives for fire management as described in the Fire Management Plan.

Goal 1: Protect the most sensitive cultural resources from wildland fires.

- The Cultural Resources Program Manager will, upon notification from the park Fire Management Officer, develop prioritized lists on cultural resource locations and coordinate this information prior to the commencement of any proactive fire operations such as fuel reduction, fire breaks, or prescribed fires.

Goal 2: Minimize adverse impacts to cultural resources during fire operations.

- Coordinate all fire operations, including fire suppression, prescribed fires, and non-fire fuel reduction measures, with the Cultural Resources Program Manager.
- Educate all personnel involved in fire management activities about regulations and strategies for protecting the park's cultural resources.
- Rely on natural barriers, such as cliffs and rivers, and the use of water to control wildland fires to the greatest extent possible.
- Only excavate fire control lines if absolutely necessary.
- When unanticipated, significant detrimental impacts occur to cultural resources, appropriately stabilize and rehabilitate those resources.

Goal 3: Protect new discoveries as necessary.

- The Cultural Resources Program Manager will provide annual training to encourage firefighters to report new cultural resources discoveries.
- Survey areas recently exposed by fires when feasible.
- Determine whether any measures are required to protect new discoveries from the public, weathering, or other threats and implement those measures.

Scope of the Cultural Resource Matrix

Table 1 explains *Cultural Historical Periods* for the various resource types known, or suspected to be present, at Amistad National Recreation Area.

Table 2 describes potential fire program effects and treatments for the *Prehistoric Resources* at the park.

Table 3 describes potential fire program effects and treatments for the *Historic Resources* at the park.

Park resource management, fire, and interpretive staff began developing the Cultural Resource Component (CRC) by defining historic contexts and a list of cultural resource types that included elements and values at risk from fire to develop the matrix.

This matrix considers historical, archeological, architectural, engineering, and cultural values, has been prepared by the park's Cultural Resources Program Manager, and has been reviewed by additional NPS cultural resources professionals. The cultural resources matrix is a working summary of resources and how the fire program should relate to them. It is a useful guide, both for planning and operations, to all who will be working with fire and cultural resources in the park.

Definitions used in the tables for the Cultural Matrix

This matrix describes the cultural resources that are sensitive to Amistad NRA's fire program activities, specifies the particular aspects at risk, reviews what fire program activities creates the risk to cultural resources, defines protection objectives for these resources, and suggests methods to minimize or mitigate potential impacts in order to achieve the objectives. The following terms are critical to understanding the Cultural Matrix:

Period: The historic and prehistoric periods refer to specific intervals of time (periods) where there was a dominant cultural, political, social, economic, or life- way that left tangible remains.

Resource types: Also known as site types to archeologists, resource types represent general functional or morphological classifications for archeological resources.

Elements: These are the specific physical characteristics of the resource types (see Table 1). Identifying the elements allows for the definition of specific elements or values at risk from various fire management activities.

Risk conditions or activities: These are the specific environmental conditions and/or fire management activities that place particular resources at risk.

Fire Management Objectives: Specific objectives are used to guide actions in a way that protects the elements or values at risk

Treatments or prescriptions: These are specific methods tailored to each resource that will most likely produce the desired objectives.

Amistad National Recreation Area Cultural Resources at Risk from Fire

Table 1. Culture- Historical Periods for the various resource types known, or potentially present, at Amistad National Recreation Area.

Prehistoric Period	Time Frame	Elements
PaleoIndian	10,000 B.C. - 7,000 B.C.	The specific physical characteristics (i.e. elements) of the various resource types are essentially the same for all prehistoric periods and include <i>occupational sites</i> (lithic scatters, quarries, burned rock scatters, burned rock middens, middens, mortar holes, grinding features, perishable floral/faunal archeological deposits) and <i>ceremonial sites</i> (pictographs, petroglyphs, burials). The land forms on which the various feature types (i.e. elements) are found include: karst features (caves, rockshelters, sinkholes), river and stream terraces, springs, and upland locales.
Early Archaic	7,000 B.C. 4,500 B.C.	
Middle Archaic	4,500 B.C. 1,000 B.C.	
Late Archaic	1,000 B.C. - A.D. 600	
Late Prehistoric	A.D. 600 – A.D. 1528	
Historic Period	Time Frame	Elements
Historic Native American	1528- 1590	trails, campsites, rock art, burials
Spanish Colonial	1590- 1821	trails, campsites, graffiti, burials, military artifacts, military structures, religious structures
Mexican Colonial	1821- 1836	trails, campsites, graffiti, burials, military artifacts, domestic structures, ranch structures
Texas Republic	1836- 1845	trails, campsites, graffiti, military artifacts, burials, ranching activities
Texas Statehood (pre Civil War)	1845- 1861	trails, campsites, burials, graffiti, ranching activities, U.S. Army activities
Civil War	1861- 1865	trails, campsites, graffiti, burials, military artifacts

Texas Statehood (post Civil War)	1865- 1880	trails, campsites, graffiti, burials, ranching activities, military activities
Railroad Era	1880- WW II	Military activities, tunnels, trestles, graffiti, construction camps, railroad grades, burials, trash scatters, building and other structural remains
Ranching Era	1880- WW II	ranching activities, railroad activities, military activities
WW II Era	1941- 1945	trails, military artifacts, camps and structures for protection of railroad bridges
Post WW II Era	1945- present	ranching activities, railroad activities, and post 1969 Park Service activities

Table 2. Prehistoric site context

Prehistoric Period Site Elements at Risk (all temporal periods)	Elements or Values at Risk	Risk Conditions or Activities	Fire Management Objective	Treatments or Prescriptions
lithic scatters	spatial integrity, artifact damage, scientific potential	ground disturbance, heat, erosion, fuel accumulation (burning roots)	allow low- to-moderate fire, avoid ground disturbances	avoid fire line construction unless absolutely necessary
quarries	spatial integrity, artifact damage, scientific potential	ground disturbance, heat, erosion, fuel accumulation (burning roots)	allow low- to-moderate fire, avoid ground disturbances	avoid fire line construction unless absolutely necessary
burned rock scatters	spatial integrity, artifact damage, scientific potential, date contamination	ground disturbance, heat, erosion, fuel accumulation	allow low- to-moderate fire, avoid ground disturbances	avoid fire line construction unless absolutely necessary
burned rock middens	spatial integrity, date contamination, stratigraphic integrity, artifact damage (organic materials), scientific potential	ground disturbance, heat, erosion, fuel accumulation, fuel accumulation (burning roots)	suppression, reduce fuels, avoid ground disturbances	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary
middens <i>(with limited amounts of burned rock)</i>	spatial integrity, date contamination, stratigraphic integrity, artifact damage	ground disturbance, erosion, fuel accumulation, fuel accumulation (burning	suppression, reduce fuels, avoid ground disturbances	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line

	(organic materials), scientific potential	roots)		construction unless absolutely necessary
perishable archeological deposits <i>(primarily found in cave, rockshelter, sinkhole sites)</i>	spatial integrity, stratigraphic integrity, artifact damage (organic materials), scientific potential	heat, soot, combustible organic artifacts, ground disturbance, fuel accumulation (burning roots)	suppression, reduce fuels, avoid ground disturbances	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary
bison jump/drive sites <i>(primarily found at the base of canyon walls)</i>	spatial integrity, stratigraphic integrity, artifact damage (organic materials), scientific potential, interpretive potential	heat, soot, combustible organic artifacts, ground disturbance, fuel accumulation (burning roots)	suppression, reduce fuels, avoid ground disturbances	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary
pictographs	spatial integrity, rock spalling, scientific potential, interpretive potential	heat, soot, ground disturbance	suppression, reduce fuels, avoid ground disturbances, avoid all contact with rocks/walls on which pictographs are located	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary
petroglyphs	spatial integrity, rock spalling, scientific potential, interpretive potential	heat, soot, ground disturbance	suppression, reduce fuels, avoid ground disturbances, avoid all contact with rocks/walls on which pictographs are located	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary

burials	spatial integrity, stratigraphic integrity, scientific potential	heat, soot, combustible organic artifacts, ground disturbance, fuel accumulation (burning roots)	suppression, reduce fuels, avoid ground disturbances,	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary
mortal hole/grinding features (<i>typically found in bedrock or boulders</i>)	feature integrity, scientific potential, interpretive value	heat/rock spalling, soot	allow low- to- moderate intensity fire, avoid disturbance	avoid fire line construction unless absolutely necessary
rock alignments	feature integrity, scientific potential, interpretive value	heat/rock spalling, soot	allow low- to- moderate intensity fire, avoid disturbance	avoid fire line construction unless absolutely necessary

Table 3. Historic site context

Historic Period Site Elements at Risk (all temporal periods)	Elements or Values at Risk	Risk Conditions or Activities	Fire Management Objective	Treatments or Prescriptions
trails (Native American, Spanish, Mexican, commercial, military, ranch, railroad)	spatial integrity, artifact damage, scientific potential, interpretive potential	ground disturbance, erosion, fuel accumulation (burning roots)	allow low- to-moderate fire, avoid ground disturbances	avoid fire line construction unless absolutely necessary
campsites (Native American, Spanish, Mexican, commercial, military, ranch, railroad)	spatial integrity, artifact damage, stratigraphic integrity, scientific potential, interpretive potential	ground disturbance, erosion, fuel accumulation (burning roots)	allow low- to-moderate fire, avoid ground disturbances	avoid fire line construction unless absolutely necessary
graffiti (painted, chiseled during most historic periods)	spatial integrity, rock spalling, scientific potential, interpretive potential	heat, soot, ground disturbance	suppression, reduce fuels, avoid ground disturbances, avoid all contact with rocks/walls on which pictographs are located	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary
burials (all historic periods)	spatial integrity, rock spalling, scientific potential	heat, soot, ground disturbance, fuel accumulation (burning roots)	suppression, reduce fuels, avoid ground disturbances, avoid all contact with rocks/walls on which	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless

			pictographs are located	absolutely necessary
ranching activities (<i>structures, troughs, water tanks, windmills</i>)	spatial, scientific potential, interpretive potential	heat, soot, combustible organic artifacts, ground disturbance, fuel accumulation (burning roots)	suppression, reduce fuels, avoid ground disturbances	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary
Spanish colonial (<i>trails, campsites, graffiti, burials, military artifacts, military structures, religious structures</i>)	spatial integrity, stratigraphic integrity, artifact damage (organic materials), scientific potential, interpretive potential	heat, soot, combustible organic artifacts, ground disturbance, fuel accumulation (burning roots)	suppression, reduce fuels, avoid ground disturbances	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary
Mexican colonial (<i>trails, campsites, graffiti, burials, military artifacts, domestic structures, ranch structures</i>)	spatial integrity, rock spalling, scientific potential, interpretive potential	heat, soot, ground disturbance	suppression, reduce fuels, avoid ground disturbances, avoid all contact with rocks/walls on which pictographs are located	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary
Historic Railroad (<i>tunnels, trestles, grades, trash scatters, construction camps, and various structural remains</i>)	spatial integrity, rock spalling, scientific potential, interpretive potential	heat, soot, ground disturbance	suppression, reduce fuels, avoid ground disturbances, avoid all contact with rocks/walls on which pictographs are	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary

			located	
Historic Ranching <i>(ranching activities, railroad activities, military activities)</i>	spatial integrity, stratigraphic integrity, scientific potential	heat, soot, combustible organic artifacts, ground disturbance, fuel accumulation (burning roots)	suppression, reduce fuels, avoid ground disturbances	use manual methods to reduce fuels around important fire- vulnerable sites, avoid fire line construction unless absolutely necessary
WW II Era <i>(trails, military artifacts, camps and structures for protection of railroad bridges)</i>	feature integrity, scientific potential, interpretive value	heat/rock spalling, soot	allow low- to- moderate intensity fire, avoid disturbance	avoid fire line construction unless absolutely necessary
Post WW II Era <i>(ranching, railroad, military, and post 1965 NPS activities)</i>	feature integrity, scientific potential, interpretive value	ground disturbance, erosion, fuel accumulation (burning roots)	allow low- to- moderate intensity fire, avoid ground disturbance	avoid fire line construction unless absolutely necessary